

West Virginia University

B u l l e t i n



1998-2000
Graduate Catalog



WEST VIRGINIA UNIVERSITY
CHARLES C. WISE, JR., LIBRARY
ACQUISITIONS DEPT., PO BOX 6009
MORGANTOWN, WV 26506

Produced by Publications Services, Office of Institutional Advancement,
West Virginia University. All material herein is copyright © West Virginia University, 1998.
Editor: Laura Spitznogle
Compositor: Karyn Cummings
Cover Design: Tammy Wymer
Cover Photography: WVU Photographic Services

West Virginia University

1998-2000 Graduate Catalog



West Virginia University, Morgantown, WV 26506 • www.wvu.edu

West Virginia University is a land grant, research institution founded in 1867.
WVU is meeting the changing needs of our state and nation through
teaching, research, service, and technology.

West Virginia University is an equal opportunity/affirmative action institution. The University does not discriminate on the basis of race, sex, age, handicap, veteran status, religion, sexual orientation, color, or national origin in the administration of any of its educational programs or activities or with respect to admission and employment. The University neither affiliates with nor grants recognition to any individual, group, or organization having policies that discriminate on the basis of race, sex, age, handicap, veteran status, religion, sexual orientation, color, or national origin, as defined by the applicable laws and regulations. Further, faculty, staff, students, and applicants are protected from retaliation for filing complaints or assisting in an investigation under the University's Equal Opportunity/Affirmative Action Plan. Inquiries regarding the University's nondiscrimination policy may be directed to the Director of Affirmative Action/EEO Programs, West Virginia University.

—Office of the President

West Virginia University (ISSN 0362-3009) Series 98, No. 4, March, 1998.
Issued in March, April, September, and October. Second-class postage paid at
Morgantown, WV 26505 and at additional mailing offices.
POSTMASTER: Send Form 3579 to West Virginia University, Morgantown, WV 26506-6568.

Table of Contents

Part 1 Government and Organization of WVU	5
Board of Trustees, Board of Advisors, Cabinet	7
Assistant Vice Presidents, Deans, Directors.....	8
Chaired and Distinguished Professors	9
Degree Programs	10
Part 2 Graduate Education at WVU	12
Organization	13
Graduate Faculty	14
Application	16
International Students	18
Transfer Procedures	20
Admission	21
Enrollment and Registration	23
Scholarship	26
Withdrawals	29
Degree Completion	30
Doctoral Degree	31
Summary of Doctoral Requirements	34
Summary of Master's Requirements	35
Part 3 Facilities, Fees, and Financial Aid	36
Facilities, Housing, Library Services	36
Residency Policy	38
Fees and Expenses	40
Student Refund Policy	41
Financial Aid	42
Academic Honesty/Integrity	45
Fee Charts	48
Part 4 Programs and Courses	51
College of Agriculture, Forestry and Consumer Sciences	53
Agricultural Education (M.S.)	59
Agricultural and Resource Economics (M.S.)	61
Agricultural Sciences (Ph.D.)	65
Animal and Veterinary Sciences (M.S.)	67
Family and Consumer Sciences (M.S.)	70
Forestry (M.S.R.P.M., M.S.W.F.M., M.S.F., Ph.D.)	73
Genetics and Developmental Biology (M.S., Ph.D.)	79
Natural Resource Economics (Ph.D.)	81
Plant and Soil Sciences (M.S.)	85
Reproductive Physiology (M.S., Ph.D.)	90
Eberly College of Arts and Sciences	91
Biology (M.S., Ph.D.)	101
Chemistry (M.S., Ph.D.)	106
Communication Studies (M.A.)	111
English (M.A., Ph.D.)	114
Foreign Languages (M.A.)	121
Geography (M.A.)	131
Geology (M.S., Ph.D.)	136
History (M.A., Ph.D.)	143
Liberal Studies (M.A.L.S.)	151
Mathematics (M.S., Ph.D.)	153
Philosophy (no graduate degree)	159
Physics (M.S., Ph.D.)	160
Political Science (M.A., Ph.D.)	165

Psychology (M.A., Ph.D.)	171
Public Administration (M.P.A.)	177
Sociology and Anthropology (M.A.)	181
Statistics (M.S.)	184
Women's Studies (no graduate degree)	188
College of Business and Economics	190
Professional Accountancy (M.P.A.)	193
Business Administration (M.B.A.)	197
Economics (M.A., Ph.D.)	210
Industrial Relations (M.S.)	216
College of Creative Arts	223
Art (M.A., M.F.A.)	226
Music (M.M., D.M.A., Ph.D.)	234
Theatre (M.F.A.)	245
School of Dentistry	252
Dental Hygiene (M.S.)	254
Endodontics (M.S.)	255
Orthodontics (M.S.)	258
College of Engineering and Mineral Resources	260
Chemical Engineering (M.S.C.E., M.S.E., Ph.D.)	270
Civil and Environmental Engineering (M.S.C.E., M.S.E., Ph.D.)	276
Computer Science and Electrical Engineering (M.S.Cp.E., M.S.E.E., Ph.D.)	284
Industrial and Management Systems Engineering (M.S.I.E., M.S.O.H.O.S., M.S.E., Ph.D.)	302
Mechanical and Aerospace Engineering (M.S.M.E., M.S.A.E., M.S.E., Ph.D.)	310
Mining Engineering (M.S., Ph.D.)	320
Petroleum and Natural Gas Engineering (M.S.P.N.G.E.)	325
Safety and Environmental Management (M.S.)	328
College of Human Resources and Education	330
Counseling (M.A.)	338
Education Leadership Studies (M.A.)	345
Educational Psychology (M.A.)	349
Elementary Education (M.A.)	353
Reading (M.A.)	359
Rehabilitation Counseling (M.S.)	362
Secondary Education (M.A.)	365
Social and Cultural Foundations	371
Special Education (M.A.)	372
Speech Pathology and Audiology (M.S.)	379
Technology Education (M.A.)	384
Perley Isaac Reed School of Journalism	390
Journalism (M.S.J)	390
School of Medicine	400
Anatomy (M.S., Ph.D.)	406
Biochemistry (M.S., Ph.D.)	410
Center on Aging	412
Community Health Promotion (M.S.)	413
Exercise Physiology (M.S., Ed.D.)	417
Human Performance and Applied Exercise Science	417
Medical Technology (M.S.)	427
Microbiology and Immunology (M.S., Ph.D.)	431
Occupational Therapy	420
Pharmacology and Toxicology (M.S., Ph.D.)	435
Physical Therapy	424

Physiology (M.S., Ph.D.)	437
Public Health (M.P.H.)	440
School of Nursing	443
Nursing (M.S.N.)	446
School of Pharmacy	451
Pharmaceutical Sciences (M.S., Ph.D.)	452
School of Physical Education	455
Physical Education (M.S., Ed.D.)	456
School of Social Work	464
Social Work (M.S.W.)	465
Part 5 Special Opportunities	474
Part 6 Index	481
Academic Calendar 1998-99	488
Campus Maps	490

Correspondence

Academic Programs

Provost and Vice President for Academic Affairs
and Research
West Virginia University
P.O. Box 6203
Morgantown, WV 26506-6203
Phone: (304)293-5701 FAX: (304)293-7554

Admissions, Catalogs, Records

Office of Admissions and Records
West Virginia University
P.O. Box 6009
Morgantown, WV 26506-6009
Phone: (304)293-2121 1-800-344-WVU1
FAX: (304)293-3080
www.wvu.edu

Graduate Programs

Office of Graduate Education
West Virginia University
P.O. Box 6203
Morgantown, WV 26506-6203
Phone: (304)293-7173 FAX: (304)293-7554

Housing and Residence Life

Director, Housing and Residence Life
West Virginia University
P.O. Box 6430
Morgantown, WV 26506-6430
Phone: (304)293-4491 FAX: (304)293-3369

Scholarships, Work-Study and Veterans Educational Assistance

Student Financial Aid Office
West Virginia University
P.O. Box 6004
Morgantown, WV 26506-6004
Phone: (304)293-5242 FAX: (304)293-4890

Student Life

Dean, Student Life
West Virginia University
P.O. Box 6411
Morgantown, WV 26506-6411
Phone: (304)293-5611 FAX: (304)293-7028

Part 1 Governance and Organization of WVU

University of West Virginia System Board of Trustees

The Board of Trustees consists of seventeen persons, including a representative for staff, faculty and students of the university system. Twelve trustees are appointed by the governor to overlapping terms of six years. Other members include the Chancellor and the state superintendent of school who are not entitled to vote. The campus representatives are elected by their respective constituents. The term of the classified representative is two years and are eligible to succeed themselves.

The Advisory Council of Classified Employees to the University System of West Virginia is created to provide classified employees of the University System a means of conveying their concerns and recommendations on employee-employer relations to the Board of Trustees.

The University System includes Marshall University, Marshall University Graduate College, Potomac State of West Virginia University, Robert C. Byrd Health Sciences Charleston Division of West Virginia University, West Virginia Network for Educational Telecomputing, West Virginia School of Osteopathic Medicine, West Virginia University, West Virginia University at Parkersburg and West Virginia University Institute of Technology. Authority of and for the Advisory Council of Classified Employees (ACCE) is granted by the WV Code 18B-6-4.

WVU Board of Advisors

The Board of Advisors reviews and provides advice upon all University proposals involving the University's "mission, academic programs, budget, capital facilities, and such other matters as requested by the president of the institution or the Board of Trustees or otherwise assigned by law." The board also may review "all proposals regarding institution-wide personnel policies."

The board ordinarily has 11 members, including seven lay citizens of West Virginia, a University administrative officer appointed by the president, a full-time faculty member with at least the rank of instructor elected by the University faculty, a student in good academic standing chosen by the student body, and a member of the classified staff elected by the classified staff. When serving as the search and screening committee for a new University president, the Board of Advisors is expanded to seventeen members.

Faculty Senate

The Faculty Senate is an elected, representative body chosen by the members of the Faculty Assembly. The Senate exercises the legislative power of the faculty and has the authority to recommend general policies to the President and the Board of Trustees with regard to objectives and academic standards for the University. The Senate (1) considers issues related to the organizational structure of the University with reference to academic matters; (2) approves programs and courses, the academic calendar, and class scheduling; (3) examines elements of student life; (4) recommends general policies for convocations, lectures, entertainment, publications, radio/television, and libraries, physical plant, and equipment; (5) recommends honorary degree candidates; and (6) regulates educational policies, programs, and functions under its purview. Decisions are subject to review by the Faculty Assembly and approval by the President and Board of Trustees.

Senators are elected by members of the University faculty. For continuity, approximately one third of the Senate is elected each year. Senators normally serve for a term of three years. They are eligible to serve two consecutive full terms but then are ineligible for reelection until one year has elapsed.

Faculty Assembly

The University Faculty Assembly includes the University president as presiding officer, vice presidents, academic deans, associate deans, professors, associate professors, assistant professors, and instructors holding appointments on a full-time basis. The assembly meets once a year in September.

Student Administration

West Virginia University also has a tradition of strong student administration that touches all aspects of student life and represents student opinion to the administration and faculty. Student administration has three main units: the executive branch, the 11-member board of governors, and the judicial board. Students also serve on University-wide committees and on the Mountainlair Advisory Council.

Staff Council

The Staff Council is an advisory council to the president of the University and a means for all classified employees to express their opinions about job conditions, fringe benefits, employee-employer relations, or other areas that affect their jobs. The council is composed of 24 elected members. Council meetings are on the third Wednesday of each month. All meetings are open to the public.

Local 814

Local 814, of the Laborers' International Union of North America, AFL-CIO, represents employees throughout the University and its affiliates. These employees are in craft/maintenance, service, clerical and technical job categories, with a wide variety of job classification. Laborers' Local 814 is the only recognized union at the University by agreement through the Memorandum of Accord.

West Virginia University is a member of the North Central Association of Colleges and Schools. The University's educational programs are accredited by the North Central Association and by the appropriate accreditation agencies for professional programs.

The 1998-2000 West Virginia University Graduate Catalog, produced by WVU Publications Services, is a general source of information about course offerings, academic programs and requirements, expenses, rules, and policies. The courses, requirements, and regulations contained herein are subject to continuing review and change by the University of West Virginia Board of Trustees, University administrators, the Faculty Senate, and the faculties of the colleges and schools to meet the goals and objectives of the University. The University, therefore, reserves the right to change, delete, supplement, or otherwise amend at any time the information, course offerings, requirements, rules, and policies contained herein without prior notice.

University of West Virginia System Board of Trustees

Charles W. Manning, Chancellor
David G. Todd, Chairman
Cathy M. Armstrong, Vice Chairman
Ron D. Stollings, Secretary
Richard M. Adams
Phyllis H. Arnold
Cara M. Esposito
Bertram W. Gross
John R. Hoblitzell
Lucia B. James
J. Thomas Jones
Sharon B. Lord
Paul R. Martinelli
A. Michael Perry
Joseph W. Powell
Bruce M. Van Wyk
Clifford M. Trump, Ex-Officio
Henry R. Marockie, Ex-Officio

WVU Board of Advisors

Irene Keeley, Chair
Thomas A. Winner, Vice Chair
Vaughn Kiger, Secretary
Willie Akers
Dennis M. Bone
Kay Goodwin
Sharon A. Nicol
Richard Beto
Rosemary Haggett
Carl Roter
Rachel Welsh
David C. Hardesty, Jr.
Kathryn A. Brailer, President, Potomac
State College
Eldon Miller, President, WVU-
Parkersburg
John Carrier, President, WVU Institute of
Technology

West Virginia University Cabinet

Robert Biddington, Associate Vice
President, Health Sciences
Fred Butcher, Director, Mary Babb
Randolph Cancer Center; Senior
Associate Vice President, HSC
Lawrence S. Cote, Associate Provost for
Extension and Public Service; Direc-
tor, Cooperative Extension Service

Carolyn Curry, Special Assistant to the
President for Communication
Robert D'Alessandri, Vice President,
Health Sciences; Dean, School of
Medicine
Russell Dean, Associate Provost
for Curriculum and Instruction
Peggy Douglas, Executive Officer for
Social Justice
Stephen L. Douglas, Executive Vice
President, WVU Alumni Association
Kenneth Gray, Vice President for
Student Affairs
James K. Hackett, Associate Vice
President for Finance
Hilda Heady, Associate Vice President
for Rural Health
David C. Hardesty, Jr., President
Hayward Helmick, Staff Council
President
Scott Kelley, Vice President, Administra-
tion, Finance and Human Resources
Gerald Lang, Provost and Vice President
for Academic Affairs
Michael J. Lewis, Associate Vice
President for Health Sciences,
Charleston Division
Nancy L. Lohmann, Senior Associate
Provost for Academic Affairs
Bruce McClymonds, President of WVU
Hospitals
William Reeves, Provost for Research
and Economic Development
Herman L. Moses, Dean of Student
Affairs
Terry Ondreyka, Associate Vice Presi-
dent, Finance
Kenneth Orgill, Associate Provost for
Information Technology
Virginia Petersen, Special Assistant to
the President and Provost
Jon A. Reed, Executive Officer and
General Counsel
James A. Robinson, President, WVU
Foundation, Inc.
James Shumway, Faculty Senate Chair
David Satterfield, Chief of Staff
George R. Spratto, Dean, School of
Pharmacy
Rachel Welsh, Student Body President
Nancy Wood, Executive Assistant to the
President

Assistant Vice Presidents

Johnnie Byrd, Computer and Information Resources
Ann Chester, Health Sciences
Drayton Justus, Human Resources
Amir Mohammadi, Student Affairs
Stephen Showers, Facilities and Services
Wesley Williams, Jr., Faculty Development
C.B. Wilson, Faculty Development

Deans

Aerospace Studies, Col. Richard Evans
Carruth Center for Counseling and Psychological Services, Catherine Yura
College of Agriculture and Forestry, Rosemary Haggett
Eberly College of Arts and Sciences, M. Duane Nellis
College of Business and Economics, Sydney V. Stern
College of Creative Arts, Philip Faini
School of Dentistry, Robert Hornbrook
College of Engineering and Mineral Resources, Allen Cogley
College of Human Resources and Education, William Deaton
Perley Isaac Reed School of Journalism, William T. Slater
College of Law, (Interim) John Fisher
Library Services, Ruth M. Jackson
School of Medicine, Robert D'Alessandri
School of Nursing, E. Jane Martin
School of Pharmacy, George R. Spratto
School of Physical Education, Dana Brooks
School of Social Work, Karen V. Harper
Student Affairs, Herman L. Moses

Directors

AAO/EEO Program, Jennifer McIntosh
Academic Computing, Donald McLaughlin
ADA Compliance, Barbara T. Judy
Administrative Information Systems, Robert Paulson
Administrative Services, Jeri Ireland
Admissions and Records, Evie Brantmayer
Athletics, Edward M. Pastilong
Budget Planning, Narvel G. Weese, Jr.
Bureau of Business and Economic Research, Tom. S. Witt
Career Services Center, Robert L. Kent
Carruth Center for Counseling and Psychological Services, Catherine Yura

Center for Aging/Education Unit, Hana Hermanova
Center for Black Culture and Research, Katherine Bankhole
Center for Women's Studies, Helen M. Bannan
Concurrent Engineering Research Center (CERC), Ramana Reddy
Environmental Health and Safety, Roger L. Pugh
Extended Learning, Sue Day-Perroots
Financial Aid Office, Brenda Thompson
Graduate Education, (Interim) Bob Stitzel
Health Sciences, Robert Biddington
Housing and Residence Life, Carole Henry
Human Resources, Myrtho Blanchard
Humanities and Social Sciences, Esther Gottlieb
Information Technology and Customer Service, Lewis McDaniel
Institute of the History of Technology and Industrial Archaeology, Emory L. Kemp
Institute of Occupational Environmental Health, Alan M. Ducatman
Institute for Public Affairs, Robert Dilger
Institutional Analysis and Planning, Kathleen K. Bissonnette
Internal Auditing, William R. Quigley
International Programs, Daniel Weiner
Mary Babb Randolph Cancer Center, Fred Butcher
Military Science, LTC Margaret M. Bahnsen
Mountainlair, Michael Ellington
National Research Center for Coal and Energy, Richard A. Bajura
Network Services, Virgil Boerio
News and Information Services, Rebecca Lofstead
Physical Plant, Robert Cremer
Potomac State College, Kathryn Brailer
Printing Services, Paul H. Stevenson
Program Development for Science and Engineering, Richard Kouzes
Procurement Services, Ed Ames
Publications Services, Angela Caudill
Public Safety and Transportation Services, Bobby Roberts
Radio and Television Services, (Interim) John Duwall
Regional Research Institute, (Interim) Luc Anselin

Research Facilities Office, James R. Shaub
 Sponsored Programs, William W. Reeves
 Student Activities and Educational
 Programming, David H. Taylor
 Telecommunications and IT Business
 Services, Timothy Williams
 Trademark Licensing, Rob Cleveland
 Undergraduate Academic Services Center,
 Nicholas Evans
 UACDD, Ashok Dey
 University Honors Program and Governor's
 School for Science and Math,
 William E. Collins
 WV Network, Henry Blosser

Chaired and Distinguished Professors

Daniel Banks, M.D., N. LeRoy Lapp
 Professor of Pulmonary and Critical Care
 Medicine
 Shawn Chillag, M.D., Warren Point Chair
 of Internal Medicine
 Franklin D. Cleckley, Arthur B. Hodges
 Professor of Law
 Patrick Conner, Eberly College of Arts and
 Sciences Centennial Professor of English
 Echol "Bud" E. Cook, George Berry Chair
 of Engineering
 Bernard R. Cooper, C.W. Benedum
 Professor of Physics
 Naresh Dalal, Eberly College of Arts and
 Sciences Centennial Professor of
 Chemistry
 Charles R. DiSalvo, Woodrow A. Potesta
 Professor of Law
 Georg Eifert, Eberly Professor of Clinical
 Psychology
 William W. Fleming, Mylan Chair of
 Pharmacology and Toxicology
 Gabor B. Fodor, Centennial Professor of
 Chemistry, *Emeritus*
 Ruel E. Foster, C.W. Benedum Professor
 of English, *Emeritus*
 Mathis Frick, Orlando Gabriele Chair of
 Radiology
 Frank Gagliano, C.W. Benedum
 Professor of Theatre
 Mark Gibson, M.D., OB/GYN, Margaret
 Sanger Chair of Family Planning and
 Reproductive Physiology

Rakesh K. Gupta, GE Plastics Professor
 of Materials Engineering
 Robert Hoeldtke, Charles E. Compton
 Chair of Nutrition
 Ronald L. Klein, Power Professor of
 Electrical and Computer Engineering
 Davied Kreulen, Edward J. Van Liere
 Professor of Physiology
 Kennon Lattal, Eberly College of Arts and
 Sciences Centennial Professor of
 Psychology
 Ronald Lewis, Eberly Professor of
 American History
 Donald E. Lively, William J. Maier, Jr.,
 Visiting Chair of Law
 Robert Moss Markley, Jackson Chair of
 English
 Robert S. Maust, Louis F. Tanner
 Professor of Public Accounting
 Brian McHale, Eberly Professor of
 American Literature
 Thomas P. Meloy, C.W. Benedum
 Professor of Mineral Processing
 William H. Miernyk, C.W. Benedum
 Professor of Economics, *Emeritus*
 Syd S. Peng, Charles T. Holland Professor
 of Mining Engineering
 Hayne W. Reese, Centennial Professor of
 Psychology
 Mohindar Seehra, Eberly Professor of
 Physics (Materials Science)
 Kenneth Showalter, Eberly Professor of
 Chemistry

WVU Degree Programs

College of Agriculture, Forestry and Consumer Sciences

Agricultural and Resource Economics	M.S.
Agricultural and Environmental Education	B.S.Agr. M.S.
Agricultural Sciences	Ph.D.
Agriculture	M.Agr.
Animal and Veterinary Sciences	B.S., B.S.Agr. M.S.
Family Resources	B.S.Fam.Res. M.S.
Forest Resources Management	B.S.F.
Forest and Consumer Sciences	B.S.F. & C.S. ... M.S.F & C.S.
Forestry	M.S.F.
Landscape Architecture	B.S.L.A.
Natural Resource Economics	Ph.D.
Plant and Soil Sciences	B.S./B.S.Agr. M.S.
Recreation and Parks Management	B.S.R. M.S.
Resource Management	B.S., B.S.Agr.
Wildlife and Fisheries Resources	B.S. M.S.
Wood Industries	B.S.F.

Eberly College of Arts and Sciences

Biology	B.A. M.S. Ph.D.
Chemistry	B.A., B.S. M.S. Ph.D.
Communication Studies	B.A. M.A.
Economics	B.A.
English	B.A. M.A. Ph.D.
Foreign Languages	B.A. M.A.
Geography	B.A. M.A.
Geology	B.A., B.S. M.S. Ph.D.
History	B.A. M.A. Ph.D.
Interdepartmental Studies	B.A.
Liberal Studies	M.A.L.S.
Mathematics	B.A. M.S. Ph.D.
Philosophy	B.A.
Physics	B.A., B.S. M.S. Ph.D.
Political Science	B.A. M.A. Ph.D.
Psychology	B.A. M.A. Ph.D.
Public Administration	M.P.A.
Sociology and Anthropology	B.A. M.A.
Statistics	B.A. M.S.

Board of Regents Bachelor of Arts Degree

Regents Bachelor of Arts	B.A.
--------------------------------	------

College of Business and Economics

Accounting	B.S.B.Ad.
Business Administration	M.B.A.
Business Management	B.S.B.Ad.
Economics	B.S. M.A. Ph.D.
Finance	B.S.B.Ad.
Industrial Relations	M.S.
Marketing	B.S.B.Ad.
Professional Accountancy	M.P.A.

College of Creative Arts

Art	M.A.	
Music	B.M.	M.M. D.M.A., Ph.D.
Theatre	B.F.A.	M.F.A.
Visual Art	B.F.A.	M.F.A.

School of Dentistry

Dental Hygiene	B.S.	M.S.
Dentistry		D.D.S.
Dental Specialties		M.S.

College of Engineering and Mineral Resources

Engineering	M.S.E.	Ph.D.
Aerospace Engineering	B.S.A.E.	M.S.A.E.
Chemical Engineering	B.S.Ch.E.	M.S.Ch.E.
Civil Engineering	B.S.C.E.	M.S.C.E.
Computer Engineering	B.S.Cp.E.	
Electrical Engineering	B.S.E.E.	M.S.E.E.
Engineering of Mines	B.S.E.M.	M.S.E.M.
Industrial Engineering	B.S.I.E.	M.S.I.E.
Mechanical Engineering	B.S.M.E.	M.S.M.E.
Mineral Engineering		Ph.D.
Occupational Hygiene and Occupational Safety	M.S.	
Petroleum and Natural Gas Engineering	B.S.PNGE.	M.S. PNGE.
Safety and Environmental Management	M.S.	

College of Human Resources and Education

Education		Ed.D.
Counseling	M.A.	
Counseling Psychology		Ph.D.
Education Leadership	M.A.	
Educational Psychology	M.A.	
Elementary Education	B.S.E.Ed.	M.A.
Reading	M.A.	
Rehabilitation Counseling	M.S.	
Secondary Education	B.S.S.Ed.	M.A.
Special Education	M.A.	
Speech Pathology and Audiology	B.S.	M.S.
Technology Education	M.A.	

Interdisciplinary Studies

Genetics and Developmental Biology	M.S.	Ph.D.
Liberal Studies	M.A.L.S.	
Multidisciplinary Studies	B.A.	
Reproductive Physiology	M.S.	Ph.D.

Perley Isaac Reed School of Journalism

Journalism	B.S.J.	M.S.J.
------------------	-------------	--------

College of Law

Law	J.D.
-----------	------

School of Medicine

Anatomy	M.S.	Ph.D.
Biochemistry (Medical)	M.S.	Ph.D.
Community Health Promotion	M.S.	
Exercise Physiology	B.S.	M.S.
Medical Technology	B.S.	M.S.
Medicine		M.D.
Microbiology and Immunology	M.S.	Ph.D.
Occupational Therapy	M.O.T.	
Pharmacology and Toxicology	M.S.	Ph.D.
Physical Therapy	M.P.T.	
Physiology (Medical)	M.S.	Ph.D.
Public Health	M.P.H.	

School of Nursing

Nursing	B.S.N.	M.S.N.
---------------	--------	--------

School of Pharmacy

Pharmaceutical Sciences	M.S.	Ph.D.
Pharmacy		Pharm. D.

School of Physical Education

Physical Education	B.S.P.Ed.	M.S.	Ed.D.
Sport Studies	B.S.P.Ed.		

School of Social Work

Social Work	B.S.W.	M.S.W.
-------------------	--------	--------

Part 2 Graduate Education at West Virginia University

The origin of graduate education can be traced to the medieval universities of Europe; the goal for graduate study has remained unchanged over the intervening centuries. A student undertakes such study in order to gain a deeper knowledge in a particular academic discipline and to become able to demonstrate to the faculty and practitioners in the field the attained mastery of knowledge. Consequently, graduate study cannot be defined primarily in terms of semester hours of course work beyond the baccalaureate, even though minimum course work requirements are commonly specified for graduate degrees. Minimum requirements set the lower limit for an integrated plan of study.

Graduate students are expected to become participating members of the University community and are encouraged to attend the lectures presented by visiting scholars, to listen to academic discussions of their faculty, to serve on departmental committees, and to study with their fellow graduate students. **The purpose of residency requirements is to promote such participation in the academic affairs of the University.**

Seminars

Graduate students enrolled in a graduate program within West Virginia University are expected to participate in a seminar course throughout their graduate career. Depending on the objectives set by a particular graduate program, seminars may:

- Provide an opportunity for the student to be exposed to a variety of topics.
- Give the student insight into the methods by which to communicate the significance of their research.
- Allow the student to hear outside speakers, or

- Engender discussion with faculty concerning research and the development of research methodology.

Minimum Admission Standards

At WVU, the minimum standards for admission to graduate study are set by the University Graduate Council. Beyond this point, however, faculty members in a given graduate program have complete control over who is to be admitted to undertake graduate study under their supervision; and ultimately it is they who certify which students have demonstrated sufficient mastery of the discipline to qualify for a graduate degree. While a student may be admitted for the purpose of enrolling in advanced course work, only the program faculty may grant permission for the pursuit of a degree. Likewise, a student will not be recommended for a degree until the graduate faculty of a program has indicated in writing that the student has gained the desired knowledge.

Policies

The graduate catalog sets forth the policies and rules for graduate education. It is essential that all students beginning study at the graduate level become familiar with regulations for graduate study in general as well as with the requirements of their own programs—both of which are detailed in this catalog. **Each student should request a graduate catalog when beginning graduate study and become conversant with its contents.**

Academic Common Market

West Virginia provides its residents the opportunity, through the Academic Common Market (ACM) and through contract programs, to pursue numerous academic programs not available within the state. Both programs permit West Virginians to enter out-of-state institutions at reduced tuition rates. Contract programs have been established for study in optometry, podiatry, and veterinary medicine. ACM programs are restricted to West Virginia residents who have been accepted for admission to one of the specific programs at designated out-of-state institutions. Through reciprocal agreement, WVU allows residents of states within the ACM to enroll in graduate and undergraduate programs on a resident tuition basis.

Further information may be obtained through the Associate Provost for Curriculum and Instruction, Stewart Hall, West Virginia University, P.O. Box 6203, Morgantown, WV 26506-6203; or by calling (304) 293-2661. Application must be made through the higher education authority of the state of residence. For West Virginia residents, this authority is the University of West Virginia Board of Trustees, 950 Kanawha Boulevard East, Charleston, WV 25301.

Organization of Graduate Education

West Virginia University, which is both the comprehensive and land-grant university in the West Virginia system of higher education, offers graduate work leading to 78 master's degrees and 32 doctoral degrees. The graduate programs are administered by 14 schools and colleges of the University and by some inter-unit committees.

Office of Graduate Education

The director of the Office of Graduate Education oversees the policies governing graduate education, monitors the quality of graduate programs, and sets goals for enhancing graduate education at West Virginia University. The director of graduate education reports to the associate provost for curriculum and instruction. The associate provost for curriculum and instruction derives his authority from the provost and vice president for academic affairs and works closely with the vice president for Health Sciences.

Graduate Council

The University Graduate Council consists of twelve elected faculty representatives from the schools and colleges offering graduate programs and five ex-officio nonvoting members representing the provost, the director of graduate education, the vice president for health sciences, the senate executive committee, and the graduate and professional student association. **The council derives its authority from the faculty and from the provost and vice president for academic affairs and research.** This body formulates, reviews, and recommends University-wide graduate education policies. The council reviews proposals for new graduate programs, evaluates major revisions in graduate curricula, coordinates periodic program reviews, establishes the University criteria for graduate faculty membership, and considers such other matters affecting graduate education as are brought to the council by an administrative officer of the University, a graduate faculty member, or a graduate student. The duties of the University Graduate Council include responsibility for graduate programs both on- and off-campus.

Schools and Colleges

Schools and colleges manage most of the day-to-day operation of graduate education. They determine the level of participation by individual faculty members, specify requirements for programs under their jurisdiction, and certify students for graduation.

Graduate Faculty

Members of the graduate faculty continue to play the most important role in graduate education. They are responsible for program content, they serve on graduate student committees, and they assure the quality of preparation of the University's graduates.

Regular Membership

- Regular members may chair students' committees or direct master's and doctoral research, theses, and dissertations.
- Regular members must hold appointments in tenure track positions.
- Regular members must hold either a terminal degree or have demonstrated equivalent scholarly or creative achievement as defined by their school or college. The definition of equivalent credentials must include, as a minimum, the attainment of the rank of associate professor.
- Regular members must present evidence of continuing scholarly research, or creative activity.

Schools and colleges set and publish quantitative and qualitative criteria regarding scholarly activity. These criteria are to be applied for the appointment as well as continuation of graduate faculty membership. **These initial criteria and any subsequent amendments or changes are subject to approval of the University Graduate Council** and usually include many of the following: publication in major peer review journals, publication of books and book chapters, invited and/or competitively-selected presentations of scholarly work at national and international meetings, and/or presentations and performance of artistic work at professionally-recognized affairs.

Associate Membership

Associate members may perform the same function as regular members with the exception of chairing students' committees or directing master's theses and doctoral dissertations (or equivalent). It is the prerogative of the schools and colleges to establish and publish their own criteria for associate membership. These initial criteria and any subsequent amendments or changes are subject to approval of the University Graduate

Council and should include one or more of the following requirements: research activity, scholarly publications, artistic performances or presentations, teaching experience particularly on a graduate level, and service on previous graduate committees.

Exceptions

The following individuals also must meet the same criteria (regular or associate) for review, approval, and continuation as do tenure track graduate faculty:

- Visiting professors may be appointed as members of the graduate faculty for the term of their appointments but cannot chair committees.
- Faculty holding non-tenure track appointments may be considered for graduate faculty membership.
- Emeritus faculty members may remain on the graduate faculty, subject to school or college review.
- Off-campus professionals willing to participate in graduate education may be acceptable as graduate faculty but may not chair student committees (exceptions may be approved by the director of graduate education).
- Individuals holding faculty appointments in institutions participating in cooperative doctoral programs may be considered graduate faculty, subject to school or college review.

Degree Candidates

Normally, no candidate for a degree at WVU may be a regular or associate member of the graduate faculty. Individuals seeking exceptions to this policy must submit a petition to the director of graduate education.

Evaluation of Graduate Faculty

Individuals interested in appointment to the graduate faculty must request their evaluation for initial membership. Associate members interested in reclassification as regular members must request evaluation. Faculty seeking graduate faculty status must first be evaluated by the school or college in which they hold their primary faculty appointment. If a faculty member holds a secondary appointment in another school or college or wishes to have graduate faculty status in a second school or college, this is permissible; however, faculty may not be designated a regular graduate faculty member in any school or college if such a status is not held in the primary school or college.

Time Schedule

Schools and colleges should establish an appropriate time schedule for evaluating faculty for initial appointment to the graduate faculty and for upgrading graduate faculty status. All graduate faculty are reviewed annually. The annual review is intended to assist graduate faculty members in gauging their continued progress in scholarship, research, or creative activity. **The review process for graduate faculty membership should coincide with the annual review process of all faculty.** Schools and colleges determine the appropriate mechanisms by which faculty are reviewed (School or College Graduate Council, Promotion and Tenure Committee, etc.). The results are placed in the individual's personnel file.

Continuance

Once every three years, the graduate faculty review of individuals must be accompanied by a decision to continue or discontinue their current level of membership. A faculty member whose graduate faculty membership is discontinued or changed from regular to associate status will be permitted to complete current responsibilities but may only assume additional responsibilities which are consistent with the new status.

Appeals

Appeals regarding graduate faculty membership classification shall be handled through grievance procedures identified in *Policy Bulletin 36*. Exception to any of the above must be approved by the University Graduate Council.

Faculty Pursuing Advanced Degrees

No faculty member holding instructor or professorial rank in a program unit (department, division, interdisciplinary committee, etc.) may be admitted to a graduate degree program offered through that unit. Only those people with a rank of teaching fellow, lecturer, etc. can simultaneously pursue a degree in their own unit. Faculty holding instructor or professorial rank may be admitted to a graduate degree program in another program unit.

Application

Graduate study at WVU can be compared to a contractual arrangement between the student and the graduate faculty of the University. **The student's rights, privileges, obligations, and responsibilities are contained in the graduate catalog, the plan of study, and, if research is one of the degree program requirements, the prospectus.** Although not contracts in the formal legal sense, they are agreements between the University and a student for the accomplishment of planned educational goals.

The WVU Graduate Catalog, in effect when a student begins work toward an advanced degree, constitutes the agreement between the student and West Virginia University. If there are major changes in the catalog during the course of a student's studies, a student, with the approval of his/her advisor, may agree to meet the conditions of the graduate catalog of a later year. **An agreement to change to a later catalog is an agreement to meet all the conditions of the later edition.** Students must abide by catalog changes if the changes were promulgated by the Board of Trustees or local, state, or federal law.

GRE/GMAT

Many programs at WVU require graduate record examination (GRE or GMAT) scores from all applicants, but in no program is an examination score the sole criterion for admission. Some programs require both the general and the appropriate advanced tests before considering an applicant for admission. Other programs require different tests, such as the Miller Analogies. **Specific admission requirements are found in the program sections of this catalog.** Students should take the tests required for their prospective graduate majors before enrollment in graduate studies. If GRE or GMAT tests are required, the applicant should request the Educational Testing Service to forward scores to the WVU Office of Admissions and Records. (The code identifying WVU to the GRF is 5904). In addition, students are encouraged to send a machine reproduced copy of their GRE or GMAT scores, if available, along with their initial application to the Office of Admissions and Records in order to facilitate the WVU evaluation process.

Applications to take the GRE or GMAT must be mailed to the Educational Testing Service, Princeton, NJ 08540. Information about the Miller Analogies Test may be obtained from the psychology department or the counseling service of the applicant's undergraduate institution. At WVU, call the Student Counseling Service at (304) 293-4431.

Initial Inquiry

Prospective graduate students are urged to apply for admission as early as possible. The first inquiry from a person interested in a degree program should request information from the department, division, school, or college offering the program. The reply to such an inquiry will include instructions for applying to the particular program.

Forms/Fees

In all cases, application for admission to graduate study must be made on standard forms provided by the Office of Admissions and Records. The completed form may be returned to the Office of Admissions and Records and must be accompanied by payment of a nonrefundable special service fee.

Transcripts

Applicants must at the same time arrange for an official transcript to be sent directly to the Office of Admissions and Records by the registrar or records office of the previous colleges and universities attended by the applicant. Transcripts should be requested from all institutions attended in the course of undergraduate or graduate study. Transcripts received by the Office of Admissions and Records become the property of WVU. No one is admitted to graduate study who does not hold a baccalaureate degree.

Admission

If an applicant meets the minimum admission requirements of WVU, a copy of the application is forwarded to the faculty of the program of interest by the Office of Admissions and Records. Any graduate degree program is permitted to set admission requirements beyond the minimum admission standards of the University. **No one can pursue an advanced degree at WVU unless admitted to the appropriate degree program.** A student who wishes to take courses after completing a degree must submit a new application and pay the nonrefundable service fee.

Admission Denial

If an application for admission into a graduate program is denied, the applicant may request the reasons for refusal of admission by writing to the program coordinator. It should be noted that meeting the minimum requirements for admission into a graduate program does not ensure admission. Many programs, due to resource limitations, restrict the number of admissions by selecting the top candidates among the qualified applicants. An applicant can appeal to the program for reconsideration if he/she can document factual errors in processing the application or if the decision was deemed arbitrary and capricious or discriminatory in nature.

If the matter is not resolved satisfactorily within 30 calendar days of the receipt of the appeal by the program, the applicant may appeal to the dean of the college/school. The decision of the dean, as the Provost's designee, shall be rendered within 20 calendar days of the receipt of the appeal and is **final**.

Non-degree Applicants

Students not wishing to pursue an advanced degree may apply for admission as non-degree graduate students. Applicants must complete the standard application form, pay the nonrefundable special service fee, state the area of intended study, and present evidence of a baccalaureate degree.

Second Review

Any applicant who is refused admission may have his or her application reviewed again within a year instead of submitting a new application form and fee. Any applicant who fails to enroll within a year after acceptance must reapply in the regular manner for consideration for a subsequent year.

Reapplication

When students graduate or complete the program for which they applied, they must reapply and be readmitted before taking further course work at WVU. This policy assures that the University is informed of students' objectives and assigns them an appropriate advisor. Students are assessed a service fee for each new application.

Readmission

Degree students who have been inactive two or more years must reapply for admission by completing the graduate application process.

Continuance

Master's degree students are permitted to continue in a program for a maximum of eight years under their original application. Students who have not been active students for two years must reapply and be readmitted. The application fee is assessed.

Concurrent or Additional Master's Degree

University policy permits students to obtain more than one master's degree. In these cases, a separate application is required for each program. Each application must be accompanied by payment of a nonrefundable special service fee.

A student desiring to obtain more than one master's degree must successfully complete **sufficient additional credit hours** to constitute 75 percent of the credit hours required by the additional master's degree program. An individual graduate unit may require a higher percentage of credit to be earned under its direction.

International Students

West Virginia University is authorized under federal law to enroll nonimmigrant foreign nationals as students. International students wishing to enroll for graduate work at WVU must comply with the stated academic requirements for admission and with certain additional academic and nonacademic requirements.

Letter of Inquiry

International applicants should forward a letter of inquiry one year before they intend to begin study in the United States. The University receives a large number of applications from international students. For this reason and because of the time required for the student to make visa and financial arrangements, April 1 has been established as a deadline after which applications cannot be guaranteed consideration for fall admission. International students applying for admission to West Virginia University must submit the following:

- A completed international student admission application.
- The mandatory application fee.
- The official results of the Test of English as a Foreign Language (TOEFL). TOEFL results must be sent directly to WVU by the Educational Testing Service (ETS).
- Original or certified copies of the applicant's official academic record in the original language of issue. Applicants who have studied in the United States are required to have the institutions send an official transcript directly to WVU;
- Original or certified copy of all Certificates or Diplomas in the original language of issue.
- Official English translations of the applicant's academic record and Certificates/Diplomas

All of the items listed above should be sent to the Office of Admissions and Records, West Virginia University, P.O. Box 6009, Morgantown, West Virginia 26506-6009. All material must be received by the application deadline. **All application materials should be submitted at one time if possible;** TOEFL scores and official transcripts from institutions within the United States should be requested so that these materials arrive at WVU at about the same date as the other application materials. Incomplete applications can not be guaranteed consideration for the desired semester. Applicants are encouraged to contact the academic program of interest for information about requirements other than those listed above.

Financial Documents/Student Visa

International students requiring a form I-20 or IAP-66 for student or exchange visa must provide certification of adequate financial resources. Generally, the student must provide an official bank statement showing the availability of the appropriate funds. If a private sponsor will be the student's source of support, the sponsor must submit a letter showing intent to sponsor and an official bank statement showing the availability of the appropriate funds. Other forms of support could include sponsorship certifications from the student's government or other sponsoring agency. In all cases, original or certified copies of financial/sponsorship documents must be submitted before the I-20 or IAP-66 can be issued.

English Proficiency/TOEFL Scores

All applicants whose first language is not English must provide proof of English language proficiency. West Virginia University uses the Test of English as a Foreign Language (TOEFL) as the measure of English language proficiency. A score of 550 on the TOEFL is the minimum required of all such applicants. Applicants must make arrangements to take the TOEFL well in advance of the desired date of enrollment at WVU. Information about registration for the TOEFL can be obtained by writing to the Educational Testing Service, P.O. Box 6154, Princeton, NJ 08541-6154, USA, or by contacting the local office of the United States Information Service (USIS).

Applicants who have received a high school diploma or a bachelor's degree in the United States need not submit TOEFL results.

Intensive English Program

In some cases, it may be possible to consider applications for students who lack adequate TOEFL scores and will enroll in the West Virginia University Intensive English Program. Such applicants must contact the Intensive English Program directly and notify the Office of Admissions and Records of their intentions. Applicants for graduate programs should also notify the academic department of interest of their intentions. **Admission to the Intensive English Program does not guarantee admission to the University or to a specific program of study.** Inquiries about the Intensive English Program should be directed to the Intensive English Program, Department of Foreign Languages, West Virginia University, P.O. Box 6298, Morgantown, WV 26506-6298.

Official Documents

West Virginia University requires the submission of original academic documents or certified copies of the original academic documents from institutions located outside of the United States. The required documents include the official academic record (showing course titles, dates courses were taken, and grades received) and diplomas or certificates showing the degree awarded. These documents must be in the original language

of issue. Official English translations must be provided with the official academic credentials in the original language. Any translation of a document must be a literal, word-for-word translation and must indicate actual grades received, not an interpretation of the grades.

Academic Records

Applicants for graduate programs must submit academic records from all post-secondary education. In some cases, it may be necessary for graduate applicants to submit records from secondary school.

Documents received by West Virginia University cannot be returned to the applicant. It is therefore recommended that students who have only their original academic documents submit certified copies of their credentials with their application.

Applicants who are currently enrolled in an institution and who can not submit the final academic record and certification of degree may be granted admission if the incomplete record indicates that the applicant will unquestionably meet WVU admission standards. Final admission, however, can not be approved until the complete academic record and certification of degree have been received and evaluated by the Office of Admissions and Records.

Transferring Within USA

International students applying to transfer from schools within the United States are not permitted to register at WVU until they have complied with all transfer procedures as required by the United States Immigration and Naturalization Service (INS).

Upon arrival on the campus, the student must be prepared to present the I-20 or IAP 66 to the international student advisor for formal processing. **No student should move to Morgantown without having received an assurance of admission and immigration documents from WVU.**

Transfer Procedures

A student wishing to transfer to WVU from another institution should follow the same application procedures as those outlined for other new students.

A student wishing to apply credit earned at another institution of higher education to a master's degree at WVU must obtain a transfer of graduate credit form from the Office of Admissions and Records. This form requires the signature of the student's unit chairperson or designee. The student must also have an official transcript from the other institution sent to the Office of Admissions and Records. **Only credit earned at institutions accredited** (e.g., North Central accreditation) **at the graduate level may be transferred.** Non-degree graduate students are not permitted to transfer credit to WVU from another institution.

Credit Hours

A maximum of 12 semester hours from other institutions may be transferred for credit at WVU in master's degree programs requiring 30 to 41 semester hours. Eighteen semester hours can be accepted for master's degree programs requiring 42 or more semester hours. Individual graduate programs may accept fewer credit hours. Permission forms to apply for transfer credit must be obtained from and returned to the Office of Admissions and Records. It is strongly recommended that students have transfer credit approved prior to enrolling in course work.

Transfer to Another Program

A student may initiate a transfer to another program by contacting the dean's office of the school or college where enrolled. Following the student's request, the dean's office will send the student's record to the school or college that the student wishes to enter. The school or college receiving the record is required to acknowledge receipt of the record and notify the Office of Admissions and Records of the status of the student's application within 30 days. If a student is accepted by the new school or college, the school or college retains the student's record and notifies the student of acceptance. If a student is rejected, he or she is notified of such action, and the student's record is returned to the original school or college. The Office of Admissions and Records is responsible for updating students' records to reflect new majors and new advisors.

Internal Credit Transfers

When a student transfers from one unit or program to another unit or program within the University, the faculty of the new unit determines if any credit earned under the guidance of the prior unit may be applied to a degree, certificate, or other educational offering of the new unit.

Programs may establish admission requirements in addition to those set by the University Graduate Council, such as a higher grade-point average, the submission of scores on standardized tests, and the receipt of letters of recommendation.

Admission to Graduate Study

Classifications

Regular graduate students are degree-seeking students who meet all the criteria for regular admission to a program of their choice. The student must possess a baccalaureate degree from a college or university, must have at least a grade-point average of 2.75 on a 4.0 scale, have met all the criteria established by the degree program, and be under no requirements to make up deficiencies.

A student may be admitted as provisional by any unit when the student possesses a baccalaureate degree but clearly does not meet the criteria for regular admission. The student may have incomplete credentials, deficiencies to make up, or may have an undergraduate scholastic record which shows promise, but less than the 2.75 grade-point average required for regular admission.

A non-degree student is a student not admitted to a program. Admission as a non-degree student does not guarantee admission to any course or program. The reasons for non-degree admission may be late application, incomplete credentials, scholarship deficiencies, or lack of a degree objective. Even though a non-degree student has not been admitted to a graduate program, a unit may allow a non-degree student to enroll in its courses. **To be admitted as a non-degree student, a student must only present evidence of a baccalaureate degree and a 2.50 grade-point average, but the student must obtain a 2.50 grade-point average on the first 12 credit hours of course work and maintain this average as long as enrolled.** (see p. 23 "Previous Graduate Study" for an exception to this rule.) To be eligible to enter a degree program, the student must maintain a minimum of a 2.75 grade-point average on all course work taken since admission as a graduate student.

The standards cited are the minimum standards established by the University. Individual academic units or graduate programs may establish higher standards.

Academic Standards

The minimum academic standards for the different classifications are: **To be in good standing, regular students must obtain a 2.75 grade-point average in the first 12**

hours of graduate study and maintain this average throughout the time they are enrolled in graduate work. A student failing to achieve this standard will be placed on probation and must achieve a cumulative grade-point average of 2.75 by the end of the next enrollment at West Virginia University. In the case of a part-time graduate student, a 2.75 cumulative grade-point average must be obtained in the next nine hours of graduate study. A student who cannot attain the required average will be suspended.

A provisional student has been admitted to the University with one or more deficiencies. Consequently, **by completion of the 18th credit hour, the student must meet the provisions stated by the department and attain a minimum grade-point average of 2.75.** A student who fails to meet the provisions of admission or who fails to achieve the required grade-point average will be suspended. Students who meet the provisions of admission and the required grade-point average will be reclassified as regular students, and the regulations governing good standing for regular students will apply.

To be in good standing, a non-degree student must obtain a 2.50 grade-point average in the first 12 hours of graduate study and maintain this average throughout the time enrolled in graduate work. A student failing to achieve this standard will be placed on probation and must achieve a cumulative grade-point average of 2.50 by the end of the next enrollment (or nine credit hours for part-time students) at West Virginia University. Students who cannot attain the required average will be suspended. A non-degree student who later wishes to apply for admission to a degree program must have achieved a minimum grade-point average of 2.75 on all course work taken since admission as a graduate student in order to be considered.

Enrollment Regulations of Non-degree Students

Non-degree students may enroll in any course in the University for which they have the prerequisites and permission from the academic unit. Some departments that cannot accommodate non-degree students may restrict enrollments to majors only or require permits. These students are normally adults taking classes for enrichment purposes, public school teachers taking classes for certification renewal, or students taking classes as prerequisites for admission to degree programs. Since these students have not made a commitment to a degree program, are not subject to time limits, and may enroll on an irregular basis, the University policies concerning active/inactive status are more liberal than those for degree students.

A non-degree graduate student may accumulate unlimited graduate credit hours, but if the student is later admitted to a degree program, the faculty of that program will decide whether or not any credit earned as a non-degree student may be applied to the degree. **Under no circumstances may a non-degree student apply more than 12 hours of previously earned credit toward a degree.**

Advising of Non-degree Students

Each dean establishes a mechanism to advise non-degree graduate students who intend to take the majority of their course work in the dean's school or college. The mechanism may be the designation of a faculty member to advise non-degree students or the assignment of non-degree students to an advising office or center. Non-degree students who express an interest in programs in two colleges may be assigned to either by the Office of Admissions and Records. It is expected that the assigned advisor will consult the other unit for information when it is needed to assist the student. Students who are truly undecided on a major or who plan to take courses in several schools or colleges for enrichment may be assigned to the Office of Graduate Education. The number of students assigned in this manner will be quite small, and a program advisor will be assigned when a student designates a specific interest.

Previous Graduate Study

The same three admission classifications (regular, provisional, non-degree) apply to those applicants who have undertaken previous graduate study. In general, the cumulative grade-point average regulations apply to any transfer student who has not completed a graduate degree. However, an applicant who has received a master's degree from an accredited college or university may be admitted to **whatever** category is deemed most appropriate by the faculty of the program of interest. The calculation of this student's grade-point average may be based solely on the grades achieved during study for the previous master's degree.

Reclassification of Provisional Students

The provisions of a student's provisional status are specified by the graduate department or program. To be reclassified as a regular student, a student must meet the provisions stated by the department and achieve a minimum grade-point average of 2.75 on all course work taken during the provisional period. Individual degree programs may set higher grade-point average requirements.

No later than the completion of the 18th credit hour, a unit must review the student's record and make a final decision on the student's admission. A student who has met the provisions of admission and achieved the required grade-point average will be reclassified as a regular student. A student who fails to meet the provisions of admission or who fails to achieve the required grade-point average will be suspended, but may be reinstated in order to transfer to another program or to non-degree status. The academic unit must notify the student and the Office of Admissions and Records of its decision.

Upon notification by the appropriate academic unit, the Office of Admissions and Records will prohibit the registration of all provisional graduate students who have reached the maximum of 18 credit hours. Registration will not be permitted until the student is reclassified as a regular student, an exception is granted by an academic dean, or the student is transferred. A student may be admitted as a provisional graduate student more than one time, but not by the same graduate program.

All credit hours taken since admission as a provisional graduate student or to be applied to a degree count in the 18 credit-hour limit, i.e., undergraduate or graduate credit, P/F, S/U, graded courses, credit by senior petition, and transfer credit.

Other Reclassifications

Regular and provisional students may become non-degree students by choice. This includes students who fail to meet admission or academic standards or who withdraw voluntarily. To change a student to non-degree status, the advisor must process an *Academic Status Change* form through the school or college dean's office.

Non-degree students who later wish to become degree students must present all the credentials required by the degree program. This requires the processing of an *Academic Status Change* form by the student's advisor through the Office of Admissions and Records. For admission to a degree program, a non-degree student must have achieved a minimum grade-point average of 2.75 on all course work taken since admission as a graduate student.

Enrollment and Registration

Credit Limitations

Credit toward a graduate degree may be obtained only for courses listed in the graduate catalog and numbered 200-499. No more than 40 percent of course credits counted toward meeting requirements of any graduate degree may be at the 200 level. No residence credit is allowed for special field assignments or other work

taken off the WVU campus without prior approval. Graduate credit is obtained only for courses in which the grade earned is A, B, C, or S. No course in which the grade earned is D, P, F, or U can be counted toward a graduate degree, nor can courses taken under the audit option.

Credit Overloads

Graduate students are strongly recommended to limit their credit loads if they are also involved in extensive outside work or service activities. In general, persons in full-time service to the University or other employer are advised to enroll for no more than six hours of work in any one term; those in halftime service are advised to enroll for no more than 12 hours. Recommended credit loads may be less for employed graduate students in some academic colleges, schools, and departments.

It is recommended that a student enroll for no more than 15 hours of graduate courses in any one term and no more than 12 hours in the total of the two summer enrollment periods. Credit overloads may be approved for students by their advisors. Some school or college dean's offices may also choose to monitor overloads in their academic units.

Degree Progress

Students seeking master's or doctoral degrees (as determined by the student's application and letter of admission) are expected to enroll regularly and make steady progress toward their degree objectives. Master's degree students are permitted to continue in a program for a maximum of eight years under their original application. Students who have been inactive for two or more years must reapply and be readmitted. The application fee is assessed.

Current Information

The University must have current information (name, address, telephone number, major, and advisor) about students enrolling for classes in order to communicate with students and maintain permanent records. In addition, when individuals do not enroll in classes for substantial periods of time, it is costly and time consuming to continue to maintain their records on active status. For these reasons, the Office of Admissions and Records periodically deletes degree and non-degree student records from active status. Students who return after this deletion must reactivate their records by reapplying.

Advising

Each academic unit through which graduate degree programs are administered has one or more graduate advisors, and every graduate student is assigned an advisor at the time of admission or shortly thereafter. The advisor and student should meet before the first enrollment to begin formulation of a plan of study.

Plan of Study

Shortly after entrance into a degree program and usually before nine to twelve hours of graduate course work have been completed, a meeting is held among student, advisor, and committee (if appointed) to draw up a plan of study. Depending on the degree sought and the field of study, the plan may also contain an outline of the research problem to be undertaken. Some graduate programs have the student and committee meet at a later date to delineate the research project more formally as a prospectus for the report, thesis, or dissertation. **The plan of study is subject to mutual approval and is made a part of the student's record.** It then becomes a formal agreement between student and program faculty as to the conditions which must be met for completion of the degree requirements. **Any subsequent changes in the plan of study (or prospectus) can be made only through mutual agreement.** When the binding

nature of these documents is fully understood, there is less likelihood that later misunderstanding will arise. Thus, anyone who contemplates application for graduate work at WVU is urged to read the graduate catalog carefully and request clarification where needed. A student must be very aware of the right to express personal views in the drafting of the plan of study and/or research prospectus. Should disagreement arise at any time, the responsibility for arbitration rests with the dean of the school or college.

Records

Deans' offices maintain all records for monitoring student progress and for certifying students for graduation. Among these records are plans of study (subject to the school/college dean's approval); graduate committees (subject to the school/college dean's approval); grades; grade modifications, etc.

Required Minimum Enrollment

If a graduate student is using University libraries, research facilities, or consulting with graduate committee members, it is necessary for the student to enroll for at least one hour of graduate credit. In no other way can the University receive credit for its contribution to graduate study, attest to student status, and guarantee the protection to which the student is entitled. Students who take courses **intermittently** may be excused from such continuous enrollment if they are not using University facilities or consulting with faculty while they are not enrolled. **However, students formally admitted to candidacy for graduate degrees are required to register for at least one credit hour each semester as a condition of their continued candidacy.** By pursuing a degree at this institution, such persons by definition are utilizing University services, facilities, and other resources, including faculty expertise; this situation continues in cases where students have completed all required course work and are working on a thesis or dissertation. Candidates for graduate degrees who fail to maintain continuity of enrollment can be dropped from candidacy.

Extended Learning/Off-Campus Study

West Virginia operates six regional centers located at Charleston, Clarksburg, Parkersburg, Keyser, Shepherdstown, and Wheeling. Approximately 250 graduate courses are offered each term at these centers. **Students wishing to take off-campus courses for graduate credit must first be admitted as graduate students using the same procedures as for on-campus study.** It is the student's responsibility to obtain from the appropriate college, school, and department the specific requirements for degree candidacy. A new graduate professional development category is available for professionals who are seeking graduate credits but do not plan on pursuing a degree. It is also available for senior citizens taking a course for personal growth or community members interested in a specific topic. Selected courses and degree programs are offered at the centers, including special education, communication studies, safety and environmental management, computer science, business administration, community health promotion, counseling, public health, and social work. Courses in these and other fields meet public education certification requirements as well as personal and professional development goals. A master of science in nursing is available at selected sites. A doctorate with emphasis in education administration is available in cooperation with Marshall University. Special courses may be offered at other locations in the state to meet specific needs.

Graduate courses offered are approved by the appropriate department chairpersons, academic deans, director of ELO, and by the associate provost for curriculum and instruction. Advising and scholarship standards, applicable to both on- and off-campus courses, are governed by the individual academic unit.

Information about off-campus courses is available from the program unit offering the courses, the regional centers, and the Extended Learning Office (ELO), West Everly Street, P.O. Box 6800 Morgantown, WV 26506-6800.

Enrollment During Final Term

All graduate students must enroll for at least one credit hour during the term (or summer) of graduation. Graduate students who are on campus will be required to register by the normal registration deadlines. Graduate students who have left the campus will be allowed to register until the tenth week of classes in fall and spring terms and the third week of Summer-II. [Note: Quota generally waivers are not to be used to meet this enrollment requirement.]

Full/Part Time

A student is classified as full-time or part-time for any given enrollment period. **A graduate student is classified as full-time if enrolled for nine or more hours in the fall or spring terms or six or more hours altogether in the summer.** Courses taken on an audit basis are not generally recognized as contributing to full-time status determination.

Auditors

Students may enroll in courses without working for a grade or for credit by registering as auditors. Change in status from audit to credit or from credit to audit may be made during the registration period. Attendance requirements for auditors are determined by the instructor of the course being audited. It is the prerogative of the instructor to strike the name of any auditor from grade report forms and to instruct the Office of Admissions and Records to withdraw the auditor from the class, if attendance requirements are not met. Auditors are required to follow the same admission procedures as students taking the course for credit. Courses taken under the audit option are not counted toward a graduate degree or toward attaining full-time enrollment status.

Academic Rights

Students' academic rights and responsibilities are governed by Board of Trustees' policies and corresponding policies, rules, and regulations developed by each of the institutions in the University of West Virginia system of education. The rights and responsibilities of students at West Virginia University are published each year in the *WVU Student Handbook*. Copies of the *WVU Student Handbook* may be obtained from the Office of Student Life in Elizabeth Moore Hall.

Scholarship

Because of their familiarity to most students, letter grades are assigned in many graduate courses. However, **better than "average" performance is expected of graduate students.** They are enrolled for fewer credit hours than they were as undergraduates, 9 to 12 hours being the norm for a full-time graduate student, and are expected to spend more time on each course and achieve above average mastery of the material. A few grades of C may be tolerated in graduate programs if there are higher grades in other courses to compensate for them. **Although a grade of C is considered average performance for an undergraduate student, it is not acceptable as the norm for work produced by one who is studying for an advanced degree.**

Grading Scale

- A — excellent (given only to students of superior ability and attainment)
- B — good (given only to students who are well above average, but not in the highest group)
- C — fair (average for undergraduate students, but substandard for graduate students)
- D — poor but passing (cannot be counted for graduate degree credit)
- F — failure
- I — incomplete
- W — withdrawal from a course before the date specified in the University Calendar. Students may not withdraw from a course after the specified date unless they withdraw from the University
- WU — withdrawal from the University doing unsatisfactory work
- P — pass (cannot be counted for graduate degree credit—see below)
- X — auditor (no grade and no credit)
- S — satisfactory
- U — unsatisfactory (equivalent to D or F)

Pass/Fail

Pass/fail grading is not applicable to the course work for a graduate degree. A graduate student may register for any course (1-499) on a pass/fail basis only if the course involved is not included in the student's plan of study and does not count toward a graduate degree. The selection of a course for pass/fail grading must be made at registration and may not be changed after the close of the registration period. A student who, having taken a course on a pass/fail basis, later decides to include the course as part of a degree program must reregister for the course on a graded (A, B, C, D, or F) basis.

S/U

Courses graded S/U are approved by the associate provost for curriculum and instruction. Approved requests are forwarded to the Office of the Faculty Secretary and the Office of Admissions and Records for entry into the *WVU Master Course Directory*.

GPA

The grade-point average is computed on all work for which the student has registered while a graduate student, except for courses with grades of I, S, W, WU, P, and X, and is based on the following grade-point values: A = 4, B = 3, C = 2, D = 1, F = 0, and U = 0.

Faculty have the option of adding +/- scales to the letter grades but the +/- scales are not used in figuring the grade point average.

Plus/Minus

Beginning with courses taken in the fall semester of 1983, pluses and minuses can be assigned to grades of A, B, C and D. Pluses and minuses will be recorded on the student's academic record but do not affect quality point (GPA) values.

Incompletes

When a student receives a grade of I and later removes the incomplete grade, the grade-point average is recalculated on the basis of the new grade. The grade of I is given when the instructor believes that the course work is unavoidably incomplete or that a supplementary examination is justifiable. Before any graduate degree can be awarded, the grade of I must be removed either by removal of the incomplete sometime before

program completion or by having it recorded as a permanent incomplete. Only the instructor who recorded the I, or, if the instructor is no longer at WVU, the chairperson of the unit in which the course was given, may initiate either of these actions. In the case of withdrawal from the University, a student with a grade of I should discuss that grade with the appropriate instructor. An I grade eventually converts to F. Grade changes other than I to a letter grade must be accompanied by an explanatory memo.

Grades Lower Than C

Credit hours for courses in which the grade is lower than C will not be counted toward satisfying graduate degree requirements. These standards are the minimum standards for the University. A graduate program may set higher standards which the student must meet, but these must be presented in writing to all students upon admission or published in the catalog.

Graduate Credit Via Senior Petition

Undergraduate students wishing to obtain graduate credit by senior petition must obtain the standardized permission form from the Office of Admissions and Records. This form requires the signature of the student's undergraduate advisor and the dean of the college granting the undergraduate degree and the dean of the college of the intended graduate degree (if different). The policies regulating an undergraduate's enrollment in the graduate-level course for graduate credit are:

- Enrollment is only permitted in courses numbered 200-399.
- Undergraduates must be within 12 credit hours of their baccalaureate degrees and have a grade-point average of 3.0 on a 4.0 scale.
- The maximum amount of graduate credit permitted by senior petition is 12 credit hours.
- The senior petition must be approved prior to or at the time of enrollment.
- No more than 20% of the total enrollment in any 300-level course may consist of undergraduate students.

Approved senior petitions are returned to the Office of Admissions and Records so that a notation of graduate credit may be placed on the student's transcript. Any exceptions to the regulations must be approved by the dean of the school or college in which the student seeks graduate credit. **Note: Students receiving graduate credit for a course do not receive credit toward their undergraduate degree with the same course.**

Transcripts

Each copy of a transcript costs \$5.00. Two to three weeks may be required to process an application for a transcript at the close of a term or summer term. At other times the service requires approximately two to three days from receipt of the request. A transcript request must have the date of last attendance at WVU, student identification number and all names under which you attended. All requests for transcripts must be sent, in writing, directly to the Office of Admissions and Records; no phone requests are accepted.

Forfeited Transcripts

Students who default in the payment of any University financial obligation forfeit their right to claim a transcript until such time that the obligation has been satisfied.

Withdrawals

There are two types of withdrawals: withdrawal from some part of the work for which a student has registered, and a complete withdrawal from the University. **Unless the formal withdrawal procedures are completed, failing grades are recorded.** Withdrawals from some part of the work must have the initial approval of the student's advisor. It is the student's responsibility to see that all forms are properly executed and delivered to the appropriate authorities for recording.

Withdrawals From Classes

Until the Friday of the tenth week of class (or Friday of the fourth week in a six-week summer term, or Friday of the second week of a three-week summer term), students may withdraw from individual courses. Deadlines are published in the WVU *Schedule of Courses* each semester.

Students must obtain their advisor's approval before withdrawing from classes. Students, with the help of their academic advisors, are responsible for determining:

- If their course load would be reduced below the minimum requirement set by their program;
- If their course load would be reduced below the minimum hours required to qualify for a graduate assistantship or financial aid or international full-time student status;
- If the course to be dropped is a corequisite to another course the student is taking or a prerequisite to a course required the following semester. If so, the student may be required to drop the corequisite course or asked to take a substitute course the following semester.

Students who withdraw from courses before the published deadline and who follow all of the established University procedures receive a W on their transcript for the appropriate course(s). The grade-point average is not affected in any way by this mark.

Withdrawals From the University

Students who decide to leave WVU should withdraw from all classes and must do so in accordance with established University policy in order that the official transcript may reflect this action. **Students are responsible for all financial obligations and for following established procedures, including the completion of forms and delivery of the completed forms to appropriate officials.** Students not fulfilling these requirements may have difficulty withdrawing from the University. The withdrawal becomes official only after the forms have been recorded by the Office of Student Life. Students receive copies and are urged to keep them.

Any student (full- or part-time) may withdraw from all classes for which he/she is registered in the University any time before the last day on which regular classes are scheduled to meet as established by the University calendar and published in the *Schedule of Courses*.

Students who desire to withdraw from all remaining classes should report in person to the Office of Student Life at the main lobby information desk of Elizabeth Moore Hall. Withdrawal procedures will be explained at that time. Mountaineer Identification cards must be presented. Students unable to withdraw in person because of illness, accident, or other valid reasons still must notify the Office of Student Life of their intention to do so. The notification should be in writing and student Mountaineer cards must be enclosed. Students are responsible, with the help of their academic advisors, for determining how withdrawal from the University may affect their future status at the University including such aspects as suspension for failure to make progress toward a degree, violation of established academic probation, and continued eligibility for scholarship, fellowship, or financial aid.

Absences

Students and faculty have together formulated the University's policy on absences from classes. The responsibilities of student and instructor are as follows:

The student who is absent from class for any reason is responsible for work missed. Students should understand that absences may jeopardize their grades or continuance in the course. **Instructors who use absence records in the determination of grades must announce this fact to students (in writing) within the first five class meetings.** It is the responsibility of the instructor to keep an accurate record of all students enrolled. Instructors may report excessive absences to the student's dean or advisor. Students who have been absent because of illness, authorized University activities, or for other valid reasons are to have the opportunity to make up regularly scheduled examinations. As a matter of good manners, a student should inform an instructor in advance if obliged to be absent from a class meeting.

Degree Completion

Time Limit for Master's Degrees

Graduate work planned with the student's advisory committee must be satisfactorily completed within a period of eight years immediately preceding the conferring of the degree. A course taken more than eight years previously must be revalidated if it is to be used towards meeting degree requirements. Revalidation can be accomplished by submitting the following information for approval to the office of graduate education:

- A letter from the course instructor listing the criteria used to revalidate the course material.
- A copy of the student's performance on the student's revalidation examination.
- A letter from the college/school graduate coordinator and/or dean supporting the revalidation.

Course Work Requirements for Master's Degrees

Graduate Council policy requires students in a master's program must complete a minimum of 24 hours of course work other than thesis credit. A minimum of 30 total hours is also considered standard.

Research Guidelines

Any graduate student who conducts research involving experiments that utilize animals must have a protocol approved by the Animal Care and Use Committee before starting the research. Information about procedures and protocol forms may be obtained from the Office of Sponsored Programs.

Any graduate student who conducts research involving the use of human subjects must have the approval of the Institutional Review Board for the Protection of Human Subjects before starting the research. Information about procedures and approval forms may be obtained from the Office of Sponsored Programs; 886 Chestnut Ridge Road, Morgantown, WV 26505-6845.

Request for Degree

At the time of registration for the enrollment period in which all degree requirements are expected to be met, or at the latest within two weeks after such registration, each candidate is to submit a formal request for the conferring of the degree. This is done on an *Application for Graduation and Diploma* form obtainable from the school or college dean's office. The candidate must complete all requirements at least one week before the end of that enrollment period. If the degree is not actually earned during that term,

the student must submit a new *Application for Graduation and Diploma* when registering for the term in which completion is again anticipated.

Colleges and schools are responsible for seeing that master's and doctoral students meet the minimum requirements of the University as well as any additional college or school requirements. Deans' offices are responsible for maintaining all student records necessary to certify students for graduation. Attendance at the spring commencement is voluntary. Anyone not planning to attend should leave a complete mailing address with the Office of Admissions and Records so that the diploma can be mailed.

Graduate Committees

The **general requirements for all graduate committees** are listed in this paragraph, while the specific requirements are found in the succeeding paragraphs. The majority members of any graduate committee must be graduate faculty members. The chair of the committee must be a member of the graduate faculty. No more than one person may be a nonmember of the graduate faculty. No family member can serve on the graduate committee of his/her relative. All graduate committees are subject to the approval of the chairperson or designee of the department/division and the dean or designee of the college/school. Once a graduate committee has been officially established for a student, it will not be necessary to alter it because of the downgrading of the graduate faculty status of member(s) of the committee.

Master's committees consist of no fewer than three members. It is recommended that at least one member of the committee be from outside the student's department.

Master's committees of students with the thesis option must be chaired by a *regular* faculty member and the majority of the committee must be *regular* graduate faculty.

Doctoral dissertation committees consist of no fewer than five members, the majority of whom must be *regular* graduate faculty, including the chairperson. At least one member of the committee must be from a department other than the one in which the student is seeking a degree.

Theses and Dissertations

Theses and dissertations should be presented to the student's graduate advisor or committee chairperson **at least one month** before the end of the enrollment period in which completion of all requirements is expected. The form prescribed in the *Regulations Governing the Preparation of Dissertations and Theses* must be followed with the guidance of the student's graduate advisor or the chairperson of the committee. For the manuscript to be approved, there must be no more than one unfavorable vote among members of the student's committee.

Two copies with original signatures in approved typewritten or computer generated form (master's theses in bound form and doctoral dissertations unbound) must be delivered to the Charles C. Wise, Jr. Library **at least one week** before the close of the period in which the degree is expected to be completed (one week before the end of the second summer session, by the last day of the final examination period at the end of the first semester, or one week before Commencement Day at the end of the second semester).

Doctoral Degree – Specific Requirements

The program of doctoral study is planned with the student's graduate advisor and committee to combine any or all of the following: graduate courses of instruction, special seminars, independent study, supervised research, and supervised training designed to promote a broad and systematic knowledge of the major field and to prepare the student for the comprehensive qualifying and final examinations and writing of the dissertation.

The doctorate is a research or performance degree and does not depend on the accumulation of credit hours. The three requirements of the degree are admission to candidacy, residency, and completion and defense of a dissertation. The degree signifies that the holder has the competence to function independently at the highest level of endeavor in the chosen profession. Hence, the number of years involved in attaining or retaining competency cannot be readily specified. Rather, it is important that the doctoral student's competency be assessed and verified in a reasonable period of time **prior to conferral of the degree, generally five years.**

Graduate education, especially at the doctoral level, involves many learning experiences which take place outside the formal classroom setting. These involve observing and participating in activities conducted by the graduate faculty, using departmental and University libraries, attending lectures presented by visiting scholars, informal debates with fellow students, and similar activities. To insure that graduate students experience these kinds of informal learning, **doctoral programs at WVU as elsewhere generally require one year in residence in full-time graduate study.** However, because of the contractual nature of graduate study, an individual student or graduate committee may propose an alternative plan by which the student can gain equivalent educational experience. For example, the plan of study may require the student to spend time in residence at a national or foreign laboratory, institute, archive, or research center as partial fulfillment of the residency requirement.

Regulations governing admission, registration, scholarship, etc., described in the preceding sections must be followed. In addition, the student must satisfy requirements specified by the faculty responsible for the major field. **Students applying for admission to a doctoral program, after having received a master's degree at WVU, must file a new application for graduate work with the Office of Admissions and Records.**

Competence in one or more foreign languages is a common requirement in graduate degree programs. The faculty in the graduate degree program specify the language or languages and the level of competence to be demonstrated. Language examinations are arranged by the foreign language examiner, who can be contacted through the Department of Foreign Languages, and under whose direction language examinations are administered.

When only reading competence is required, the foreign language examiner may waive the examination in those cases where the student's transcript shows, at a date that proves to fall no earlier than seven years before promotion to doctoral candidacy, either completion of 12 semester hours or equivalent course work in an approved foreign language, with a grade of B or better in the last three hours; or at WVU, completion of French 306, German 306, or Russian 306 with a grade of B or better must be achieved.

Admission to graduate study and enrollment in graduate courses does not of itself imply acceptance of the student as a candidate for a doctoral degree. This is only accomplished by satisfactorily passing a comprehensive or qualifying examination (either oral, or written, or both) and by meeting specified language and/or other requirements.

Candidacy

A student will be given a comprehensive examination to demonstrate knowledge of the important phases and problems of the field of major study, their relation to other fields, and the ability to employ the instruments of research. The examination is intended to determine whether the student has the academic competence to undertake independent research in the discipline, and to insure that the student possesses a thorough grasp of the fields outlined in the plan of study. The examination, which consists of a series of tests covering all areas specified in the plan of study, is administered after most formal studies have been completed. Scheduling and results of the examination must be

reported to the school or college dean. It must be the consensus of the doctoral committee that the student has passed the examination, although the committee may permit one dissenting vote. A single portion of the examination may be repeated at the discretion of the committee, but if two or more members are dissatisfied, the entire qualifying examination must be repeated. The student must petition through the doctoral committee in order to be permitted to repeat a qualifying examination, and it is anticipated that a waiting period will be specified by the committee during which the student will have an opportunity to correct deficiencies. Academic tradition does not allow a qualifying examination to be administered more than three times.

Time Limit

Because the qualifying examination attests to the academic competence of the student who is about to become an independent researcher or practitioner, the examination cannot precede the conferring of the degree by too long a period of time. **Consequently, doctoral candidates are allowed no more than five years in which to complete remaining degree requirements.** In the event a student fails to complete the doctorate within five years after admission to candidacy, an extension of time can be obtained only by repeating the qualifying examination and meeting any other requirements specified by the student's committee.

Dissertation Research

The candidate must submit a dissertation pursued under the direction of the faculty of the University on some topic in the field of the major subject. The dissertation must present the results of the candidate's individual investigation and must embody a definite contribution to knowledge. While conducting research or writing a dissertation, the student must register at the beginning of each term or summer during which credit is being earned. No residence credit will be allowed for special field assignments or other work taken off the University campus without prior approval by the associate provost for curriculum and instruction.

Final Examination

The final examination is not given until the term or summer term in which all other requirements for the degree are to be met. After the candidate's dissertation has been tentatively approved, the final oral examination on the dissertation can be scheduled. At the option of the faculty responsible for the degree program, a comprehensive final written examination also may be required. The student's committee chairperson must indicate in advance the time, place, and recommended examining committee members, and receive clearance from the office of the school or college dean before the examination can be given. Such notifications of doctoral examinations must be received at least three weeks before the examination date. All doctoral final oral examinations are open examinations and the lead time is required for public notice to the University community.

The student cannot be considered as having satisfactorily passed the final examination if there is more than one unfavorable vote among members of the examining committee. Results of each examination must be reported to the school or college dean within 24 hours. Reexamination may not be scheduled without approval of the request by the school or college dean. **All committee members are to be present for the final examination.** If an examination cannot be scheduled at a time convenient to all committee members, the dean or his/her designee may permit another faculty member to substitute for the original committee member, provided that the original committee member was not the chair. **There can be no substitute for the chair. Only one substitute is allowed, and the request for a substitute must be made in writing prior to the examination.** The request for a substitute should be signed by the committee chair, the

student, and both the original faculty member and the substitute faculty member. A substitute faculty member must have the same or higher graduate faculty status as the original faculty member and represent the same academic discipline or specialization.

Dissertation Submission

The requirements for a doctorate include acceptance of the dissertation. The dissertation must bear the original signatures of at least all but one of the committee members. If more than one member of the committee, whatever the size of the committee, dissents from approving the dissertation, the degree cannot be recommended. If a substitute faculty member attends the final examination, the substitute signs the shuttle sheet; however, the original committee member is to sign the dissertation. The dissertation must be presented to the University not later than one week before the end of the semester or summer session in which the degree is expected to be granted (one week before the end of the summer, by the last day of the final examination period at the end of the first semester, or one week before commencement day at the end of the second semester).

All doctoral dissertations and their abstracts will be microfilmed through University Microfilms, Ann Arbor, Michigan. This requirement will not be satisfied by any other publication but does not preclude publication elsewhere, which is both permitted and encouraged. Candidates are to follow *Regulations Governing the Preparation of Dissertations and Theses* regarding format and organization of the dissertation, which is on file at the department offices, offices of all graduate advisors, and the University libraries. The candidate is required to maintain close contact with the supervisor or chairperson of the graduate committee on these matters in developing a dissertation so as to incorporate the special requirements of the subject discipline.

One week before the close of the semester or summer session in which the degree is expected to be conferred the candidate must meet these requirements:

1. Submit in a form satisfactory for microfilming, an appropriately printed, unbound original and one copy of the dissertation. Two excellent machine-reproduced copies may be acceptable. Both copies must have original signatures of the candidate's committee.
2. Submit one extra abstract of no more than 350 words. This separate abstract must have at the top of the first page the centered exact title of the dissertation, followed on the next line by the full name of the candidate, and on the next line by the word ABSTRACT. The extra abstract is on unnumbered pages.
3. Submit a microfilm contract completed and signed by the candidate.
4. Pay a fee of \$50.00 to cover the cost of microfilming the dissertation and publication of the abstract in *Dissertation Abstracts*, a bi-monthly journal which receives wide distribution. This fee is payable by certified check or money order made out to "West Virginia University." If desired, copyright service can be provided through WVU upon receipt, along with the dissertation, of a certified check or money order for \$35.00 made payable to University Microfilms.
5. Complete the questionnaire entitled *Survey of Earned Doctorates*.

Summary of Doctoral Requirements

1. Shortly after admission to the program (usually within the first 9-12 semester hours of course work), an advisory committee is formed and the committee and the student produce a plan of study.
2. Student completes requisite course work and other program requirements, satisfying also the stipulated residency requirement.
3. Student takes the language examination (if applicable).

4. Student takes written and/or oral comprehensive (qualifying) examination for admission to candidacy. The results are communicated to the appropriate office by the student's graduate program advisor.
5. Student undertakes a doctoral dissertation under the guidance of a dissertation committee. The dissertation phase begins with approval of a dissertation prospectus by the dissertation committee, the department chairperson, and the school or college dean.
6. A copy of the preliminary draft of the dissertation is given to each committee member at least one month prior to the final oral examination.
7. The dissertation advisor (committee chairperson) requests a clearance for the final examination from the school or college dean's office **no later than three weeks** before the scheduled examination date.
8. The time and place of the examination is announced.
9. The student defends the dissertation in an oral defense.
10. The student delivers two copies of the approved dissertation, appropriate questionnaires, and fees to the Charles C. Wise, Jr. Library.

Summary of Master's Requirements

1. Shortly after admission to the program (usually within the first 9-12 semester hours of course work), an advisory committee is formed and the committee and the student produce a plan of study.
2. The student completes requisite course work and other program requirements.
3. The student confers with advisor and, if applicable, chairperson of thesis committee to see if all requirements can be met by the end of the semester in which he/she plans to graduate. This should be done no later than the beginning of the final semester.
4. The student registers for at least one credit hour; either a course or for the Non-En-rolled Graduate Student Evaluation Fee (\$50). No one may graduate who is not registered as a student during the term of graduation.
5. The student checks with the University to insure that there is correspondence between departmental and University records and that there are no remaining deficiencies.
6. The student completes an *Application for Graduation and Diploma*. This should be done no later than two weeks after registration.
7. After getting a fee slip from the Office of Admissions and Records, the student pays the \$30 graduation fee at the cashier's window in the Mountainlair.
8. (*If applicable*) The student presents a typed draft of the thesis to each committee member.
9. The student should remind the committee chairperson to request clearance from the school or college dean's office at least two weeks before the date of the final examination (or thesis defense).
10. Results of the final examination (or thesis defense) must be reported to the dean's office by the graduate advisor or the committee chairperson not later than one week before the end of the semester or summer session in which the degree is expected to be granted.
11. If the requirements for the master's degree include a thesis, the thesis must bear the original signatures of at least all but one of the committee members. If more than one member of the committee, whatever the size of the committee, dissents from approving the thesis, the degree cannot be recommended. If a substitute faculty member attends the final examination, the substitute signs the shuttle sheet; however, the original committee member signs the thesis.

12. Two bound and originally signed copies of the thesis (the original and first copy or two electrostatically-reproduced copies) must be submitted to the Charles C. Wise, Jr. Library no later than one week before the degree is expected to be granted.

Part 3 Facilities, Fees, and Financial Aid

Facilities

The WVU campuses combine traditional and modern architectural styles, and eleven campus buildings are listed on the National Register of Historic Places. Many of these original buildings, including Stalnaker Hall, have recently been restored and renovated.

A new Campus Master Plan is underway in 1996. Completion of this monumental task will set the stage for numerous changes over the next 10-20 years. New buildings, departmental moves, and major renovations are expected. This will respond to institutional demands for increased efficiency related to facility space management.

In May 1995, ground breaking ceremonies were held for the WVU Westvaco Natural Resources Center. Scheduled for completion in late 1996, the center will provide classroom and research facilities in the heart of the 7,800 acre University Forest.

Major projects to be completed within this plan include an expansion of the Wise Library and a campus recreation center. Already completed projects include a parking lot near the Evansdale greenhouse, a new rugby field, and lights for the baseball field.

Parts of the campus are linked by the Personal Rapid Transit (PRT) system, which consists of computer-directed, electronic-powered cars that operate on a concrete and steel guideway, permitting quick and easy access to major locations within the University and the downtown area of Morgantown.

Greater Morgantown, with a population of 47,000, is located on the east bank of the Monongahela River in the rolling hills of northern West Virginia. Morgantown is within easy traveling distance of metropolitan areas: Pittsburgh, Pennsylvania is 75 miles to the north, and Baltimore, Maryland and Washington, D.C., are 200 miles to the east. Two major highways, Interstates 79 (north/south) and 68 (east/west), pass near Morgantown.

Of the nearly 23,000 students enrolled on the Morgantown campuses, most undergraduates are housed in the University-owned residence halls, and many married students and single graduate students live in University apartments. Approximately 3,000 students live in privately owned residence halls and fraternity and sorority houses; many commute from their parents' homes, and the rest live in apartments, mobile homes, and private rooms.

The Housing and Residence Life Office, located at 1056 Van Voorhis Road, phone (304) 293-5840 provides information about University-owned apartments for graduate students, faculty and staff. The Student Life Office, in Elizabeth Moore Hall, provides information regarding privately-owned, off-campus housing phone (304) 293-5611. Listings for rentals change daily so students should visit the Office of Student Life to check availability and make their own arrangements with landlords. Good, affordable accommodations can be found in University and private housing. Due to the terrain, parking is limited on the WVU campuses and in the city.

Because of WVU's resources, the Morgantown area is a major research center in the Appalachian region. Four federal agencies have research facilities in the area: Department of Health and Human Services (Appalachian Laboratory for Occupational Safety and Health), Forest Service (Forestry Sciences Laboratory), Morgantown Energy Technology Center of the Department of Energy, and Soil Conservation Service (West Virginia headquarters).

The West Virginia University Libraries consisting of the main library and eight branches contain over 1.3 million volumes and two million microforms. Some 20,000 volumes are added each year, and 9,000 periodical titles are received. The collections are especially strong in the biological sciences, chemistry, economics, Africana, Appalachian resources, the Health Sciences, and West Virginia History. The libraries are a federal regional depository for government information and patent and trademark information. Facilities for

research in West Virginia and regional history are centered in the West Virginia Collection Library, on the second floor of Colson Hall. In addition to an extensive collection of books, periodicals, and maps, the West Virginia Collection Library contains over five million manuscripts. These, together with court records from many counties, are invaluable sources for the study of all aspects of West Virginia and Appalachian history. The rare book room contains an unusually fine collection of first and limited editions, including four Shakespeare folios and first editions of many of the works of Dickens, Scott, and Clemens. The Libraries are fully automated with access to more than 70 electronic data bases.

The Evansdale Library houses the collections needed to support the schools and colleges on the Evansdale Campus: Agriculture, Engineering and Mineral Resources, Human Resources and Education, Social Work, Physical Education, and Creative Arts.

Discipline-specific libraries serve particular areas. The Physical Sciences Library contain 37,000 volumes in the fields of chemistry, geology, geography, physics, and astronomy is in the Chemistry Research Laboratory. The Health Sciences Center Library on the second floor of the Basic Sciences Building contains over 150,000 volumes and multimedia materials. The Law Library, with a collection of over 130,000 volumes, is in the Law Center on the Evansdale Campus. The Mathematics Library in Armstrong Hall contains approximately 16,000 volumes. The Music Library in the Creative Arts Center contains some 23,000 items, including microcards, microfilms, sound recordings, books, scores, and journals.

The Audiovisual Library located in Colson Hall contains an extensive collection of films, videos, and other multimedia to support the curriculum.

The Libraries are fully automated, providing access to more than 70 electronic databases, including CD-Roms, Wilson indexes, Current Contents, NIM, and internet resources. Access to the online electronic resources is available via faculty offices, all computer labs, and remotely, using modems. The Libraries are open 98 hours per week and most holidays.

The Office of Disability Services is located at 215 Student Services, phone (304) 293-6700. It helps qualified students with disabilities to reach their academic potential. Its services and accommodations are in keeping with our commitment to provide both architectural and programmatic accessibility. Information provided to Disability Services is treated as confidential and is not released without the student's prior consent, to the consent permitted by law.

Disability Services provides information, referral, and counseling services not only for students with visible impairments but also for students with less apparent disorders such as diabetes, cardiovascular problems, learning disorders, asthma, allergies, or epilepsy. Also served are persons with a temporary disability such as a sprained ankle, a broken arm, or a hospitalization. The following are some of the services this office provides:

- Liaison between students and faculty.
- Individual and group counseling.
- Vocational/career information and referral.
- Information for faculty on teaching strategies and alternative testing methods for students.
- Provision of interpreters, tutorial referrals, notetaking strategies, and special equipment.
- Transportation assistance, if eligible, to and from residence (within city limits) and class.

Prospective students with disabilities should contact WVU Admissions and Records (304) 293-2121 and the graduate program of interest for specific information concerning application procedures and admission requirements. All students admitted to WVU are expected to meet current admission requirements.

West Virginia University Computing and Information Resources and West Virginia Network (WVNET) provide hardware and software for all colleges and schools in the

state. The WVU Computing and Information Resources coordinates these resources and provides additional services on the WVU campuses.

WVNET hardware includes an IBM 9672-R63 with 1 gigabyte of main memory, a Digital Equipment (DEC) VAX 6000-630 with 384 megabytes of main memory, a DEC Alpha Server 4100 with 1 gigabyte of main memory, and a Thinking Machines Supercomputer with 32 megabytes of memory in each of four vectors. Disk access to the IBM systems is via an EMC Corporation Mirrored Symetrix Integrated Cache Disk Array. IBM tape storage includes an IBM 3494 Automated Tape Library, 32 IBM virtual tape server drives, and six IBM 3490E tape drives. Total DEC disk storage is 24 gigabytes. Printers include four IBM 6262 units and one IBM 3130 unit.

Languages include C, C++, COBOL, FORTRAN, PL/1, BASIC, and Pascal. Software includes C, SAS, SPSS, SPIRES, and other forms of special purpose engineering software.

Residency Policy for Admission and Fee Purposes

The following is quoted from the *Policy Regarding Residency Classification of Students for Admission and Fee Purposes*, policy bulletin number 34, published by the West Virginia Board of Trustees.

2.1 Students enrolling in a West Virginia public institution of higher education shall be assigned a residency status for admission, tuition, and fee purposes by the institutional officer designated by the President. In determining residency classification, the issue is essentially one of domicile. In general, the domicile of a person is that person's true, fixed, permanent home and place of habitation. The decision shall be based upon information furnished by the student and all other relevant information. The designated officer is authorized to require such written documents, affidavits, verifications, or other evidence as is deemed necessary to establish the domicile of a student. The burden of establishing domicile for admission, tuition, and fee purposes is upon the student.

2.2 If there is a question as to domicile, the matter must be brought to the attention of the designated officer at least two weeks prior to the deadline for the payment of tuition and fees. Any student found to have made a false or misleading statement concerning domicile shall be subject to institutional disciplinary action and will be charged the nonresident fees for each academic term theretofore attended.

2.3 The previous determination of a student's domiciliary status by one institution is not conclusive or binding when subsequently considered by another institution; however, assuming no change of facts, the prior judgment should be given strong consideration in the interest of consistency. Out-of-state students being assessed resident tuition and fees as a result of a reciprocity agreement may not transfer said reciprocity status to another public institution in West Virginia.

3.1 Domicile within the state means adoption of the state as the fixed permanent home and involves personal presence within the state with no intent on the part of the applicant or, in the case of a dependent student, the applicant's parent(s) to return to another state or country. Residing with relatives (other than parent(s)/legal guardian) does not, in and of itself, cause the student to attain domicile in this state for admission or fee payment purposes. West Virginia domicile may be established upon the completion of at least twelve months of continued presence within the state prior to the date of registration, provided that such twelve months' presence is not primarily for the purpose of attendance at any institution of higher education in West Virginia. Establishment of West Virginia domicile with less than twelve months' presence prior to the date of registration must be supported by evidence of positive and unequivocal action. In determining domicile, institutional officials should give consideration to such factors as the ownership or lease of a permanently occupied home in West Virginia, full-time employment within the state, paying West Virginia property tax, filing West Virginia income tax returns, registering of motor vehicles in West Virginia, possessing a valid West Virginia driver's license, and marriage to a person already domiciled in West Virginia. Proof of a number of these actions shall be considered only as evidence which may be used in determining whether or not a domicile has been established. Factors militating against the establishment of

West Virginia domicile might include such considerations as the student not being self-supporting, being claimed as a dependent on federal or state income tax returns, or the parents' health insurance policy if the parents reside out of state, receiving financial assistance from state student aid programs in other states, and leaving the state when school is not in session.

4.1 A dependent student is one who is listed as a dependent on the federal or state income tax return of his/her parent(s) or legal guardian or who receives major financial support from that person. Such a student maintains the same domicile as that of the parent(s) or legal guardian. In the event the parents are divorced or legally separated, the dependent student takes the domicile of the parent with whom he/she lives or to whom he/she has been assigned by court order. However, a dependent student who enrolls and is properly classified as an in-state student maintains that classification as long as the enrollment is continuous and that student does not attain independence and establish domicile in another state.

4.2 A nonresident student who becomes independent while a student at an institution of higher education in West Virginia does not, by reason of such independence alone, attain domicile in this state for admission or fee payment purposes.

5.1 A person who has been classified as an out-of-state student and who seeks resident status in West Virginia must assume the burden of providing conclusive evidence that he/she has established domicile in West Virginia with the intention of making the permanent home in this state. The intent to remain indefinitely in West Virginia is evidence not only by a person's statements, but also by that person's actions. In making a determination regarding a request for change in residency status, the designated institutional officer shall consider those actions referenced in Section 3 above. The change in classification, if deemed to be warranted, shall be effective for the academic term or semester next following the date of the application for reclassification.

6.1 An individual who is on full-time active military service in another state or foreign country or an employee of the federal government shall be classified as an in-state student for the purpose of payment of tuition and fees, provided that the person established a domicile in West Virginia prior to entrance into federal service, entered the federal service from West Virginia, and has at no time while in federal service claimed or established a domicile in another state. Sworn statements attesting to these conditions may be required. The spouse and dependent children of such individuals shall also be classified as in-state students for tuition and fee purposes.

6.2 Persons assigned to full-time active military service in West Virginia and residing in the State shall be classified as in-state students for tuition and fee purposes. The spouse and dependent children of such individuals shall also be classified as in-state students for tuition and fee purposes.

7.1 An alien who is in the United States on a resident visa or who has filed a petition for naturalization in the naturalization court, and who has established a bona fide domicile in West Virginia as defined in Section 3 may be eligible for in-state residency classification, provided that person is in the State for purposes other than to attempt to qualify for residency status as a student. Political refugees admitted into the United States for an indefinite period of time and without restriction on the maintenance of a foreign domicile may be eligible for an in-state classification as defined in Section 3. Any person holding a student or other temporary visa cannot be classified as an in-state student.

8.1 A person who was formerly domiciled in the state of West Virginia and who would have been eligible for an in-state residency classification at the time of his/her departure from the state may be immediately eligible for classification as a West Virginia resident provided such person returns to West Virginia within a one-year period of time and satisfies the conditions of Section 3 regarding proof of domicile and intent to remain permanently in West Virginia.

9.1 Each institution shall establish procedures which provide opportunities for students to appeal residency classification decisions with which they disagree. The decision of the designated institutional official charged with the determination of residency classification may be appealed in accordance with appropriate procedures established by the president of the institution. At a minimum, such procedures shall provide that:

9.1.1 An institutional committee on residency appeals will be established to receive and act on appeals of residency decisions made by the designated institutional official charged with making residency determinations.

9.1.1a The institutional committee on residency shall be comprised of members of the institutional community, including faculty and student representatives, and whose number shall be at least three, in any event, an odd number. The student representative(s) shall be appointed by the president of the institutional student government association while the faculty representative(s) shall be selected by the campus-wide representative faculty organization.

9.1.1b The student contesting a residency decision shall be given the opportunity to appear before the institutional committee on residency appeals. If the appellant cannot appear when the committee convenes a meeting, the appellant has the option of allowing committee members to make a decision on the basis of written materials pertaining to the appeal or waiting until the next committee meeting.

9.1.2 The residency appeal procedures will include provisions for appeal of the decision of the institutional committee on residency appeals to the president of the institution.

9.1.3 Residency appeals shall end at the institutional level.

Fees and Expenses

All West Virginia University fees are subject to change without notice. A nonrefundable special service fee of \$45 must accompany the application for admission to graduate studies. All fees are due and payable to revenue and loan services on the days of registration. Completion of arrangements with revenue and loan services office for payment from officially accepted scholarships, loan funds, grants, or contracts shall be considered sufficient for acceptance of registration. Fees paid after regular registration must be paid to the University cashier. Any student failing to complete registration on regular registration days is subject to a late registration fee.

At registration, students pay the fees shown in the fee charts, plus special fees and deposits as required. No degree is conferred upon any candidate and no transcripts are issued to any student before payment is made of all tuition, fees, and other indebtedness to any unit of the University.

Regulations

It is the policy of West Virginia University to place on restriction students who have outstanding debts to a unit or units of the University. The restriction may include, but is not limited to, the withholding of a student's registration, diploma, or transcript. Persons who are neither registered as University students nor members of its administrative or teaching staffs shall not be admitted to regular attendance in University classes.

Off-Campus/Music/Lab Fees

Tuition for credit hours for off-campus students are the same as those charged students enrolled on-campus. Off-campus students do not pay the Daily Athenaeum fee, the radio station fee, or the Mountainlair construction fee.

Off-campus-only students are not assessed special fees, but they are charged \$33.00 per credit hour for each off-campus course and television course.

Consult specific departmental sections of this catalog concerning nonrefundable deposits and microscope rentals.

All music majors must pay a fee of \$15.00 per semester, which entitles them to assigned practice space one hour per day. Additional space may be available at the rate of \$4.00 per hour. Band and orchestra instruments may be rented by the semester for \$10.00.

Auditors

Students may enroll in courses without working for grade or for credit by registering as auditors and by paying full fees.

Waivers

According to legislation passed by the West Virginia Legislature in 1983, WVU is limited in the number of graduate and professional waivers that can be awarded each school year. According to Board of Trustees Policy Bulletin No. 49, WVU must give priority consideration in awarding these waivers to students who are West Virginia residents and also to faculty and staff of West Virginia public and private colleges and universities.

Academic deans, directors, and vice presidents of other University of West Virginia Board of Trustees institutions are charged with responsibility of awarding tuition waivers. Students should contact the appropriate person in their department, school, or college for information regarding applications and priorities.

Student Refund Policy

Note: This policy was revised 12/22/94 and is subject to change.

Students withdrawing from the University or dropping courses such that they no longer qualify for full-time status **within the refund period** are eligible for a tuition and fee refund. Every effort is made to process refunds within 30 days. If a graduate assistantship is canceled before the end of the term, the student may be responsible for paying all or part of the tuition and fees for that term (see below).

Refund of Fees

Withdrawals To withdraw officially and receive a refund, a student must apply at the Office of Student Life. Term fees are refundable as follows:

1. Tuition, special, and refundable miscellaneous fees – Refundable based on date of withdrawal and student status.* Refer to refund schedule.
2. Optional health service fee – Refundable based on date of withdrawal and student status.* Refer to refund schedule.
3. Lab fees – Refundable during the first week of classes only based on student status.* Refer to refund schedule.
4. Nonrefundable miscellaneous fees (includes application, transcript, graduation, late registration/payment, and reinstatement fees) – These fees are nonrefundable.
5. Room and board – The unused portion of room and board is refunded on a pro rata basis, based on the date the student's belongings are removed from the room and the meal ticket/ID and room keys are surrendered.

Exceptions: Students called to the armed services of the United States may be granted full refund of refundable fees, but no course credit, if the call comes before the end of the first three-fourths of the semester. If the call comes thereafter, full credit of course(s) may be granted provided the student is maintaining a passing mark at time of departure for military services.

Students withdrawn due to catastrophic illness or death will be provided a refund as approved by the dean of student life or his/her designee.

*Students enrolled for their first semester at West Virginia University (or who received a 100% refund for previous semester) and who received Title IV aid are refunded per federal regulations. Federal regulations require refunds to be figured using both state (Board of Trustees Series #22) and statutory pro rata (Higher Education Amendments of 1992) calculations. After figuring both refunds, the calculation that provides the largest refund is given.

Dropped Courses

If a student drops below full time status (12 hours for undergraduate and 9 hours for graduates), semester fees are refundable as follows:

1. Tuition, special, and refundable miscellaneous fees – Refundable based on date of dropped course(s). Refer to refund schedule.
2. Optional health service fee – Fee is nonrefundable.
3. Lab fees – Refundable at 100% **during the first week of classes only** and nonrefundable thereafter.

4. Nonrefundable miscellaneous fees (includes application, transcript, graduation, late registration/payment, and reinstatement fees) – These fees are nonrefundable.

Refund Schedule

Fall/Spring Term (16 week session)

Refund Period	BOT*	HEA**	Refund Period	BOT*	HEA**
1st week	90%	90%	9th week		40%
2nd week	90%	80%	10th week		
3rd week	70%	80%	11th week		
4th week	70%	70%	12th week		
5th week	50%	60%	13th week		
6th week	50%	60%	14th week		
7th week		50%	15th week		
8th week		50%	16th week		

Summer Term (6 week session)

Refund Period	BOT*	HEA**
Day 1 thru 4	90%	80%
Day 5	70%	80%
Day 6 thru 8	70%	60%
Day 9 and 10	50%	60%
Day 11 and 12	50%	50%
Day 13 thru 15		50%
Day 16 thru 30		

Summer Term (3 week Session)

Refund Period	BOT*	HEA**
Day 1 and 2	90%	60%
Day 3 and 4	70%	60%
Day 5	50%	60%
Day 6	50%	60%
Day 7 thru 15		

Summer Term (2 week session)

Refund Period	BOT*	HEA**
Day 1 and 2	90%	50%
Day 3	70%	50%
Day 4	50%	50%
Day 5 thru 10		

Summer Term (1 week session)

Refund Period	BOT*	HEA**
Day 1	90%	
Day 2	70%	
Day 3		
Day 4 and 5		

* Board of Trustees Series #22: Percent = number of days in term times percent of term allocated for refund (refer to BOT Series #22). If the percent calculation identifies a partial day, the entire day is included in the higher refund period.

** Higher Education Amendments of 1992: Percent = number of weeks remaining in the enrollment period divided by total number of weeks in the enrollment period (rounded down to nearest 10%).

Non-Sufficient Funds Check Policy

A service charge of \$15 will be collected on each check returned unpaid by the bank upon which it is drawn. If the check returned by the bank was in payment of University and registration fees, the controller's office shall declare the fees unpaid and registration cancelled if the check has not been redeemed within three days from date of written notice. In such a case the student may be reinstated upon redemption of the check, payment of the \$15 service charge, and the late payment fee of \$30.

Payments of tuition, fees, and other charges by check are subject to WVU's non-sufficient funds check policy. A copy of the policy is available in the revenue and loan services office.

Financial Aid

The Student Financial Aid Office estimates that the total cost of attending WVU for a nine-month academic year is \$9,300 for single West Virginia residents living on or off-campus and \$6,700 for those living at home; \$13,385 for single nonresidents living on or off-campus and \$10,600 for those living at home. These typical estimated student budgets include tuition and fees, books and supplies, room, board, transportation, and personal expenses that provide for a modest but adequate lifestyle.

Assistantships

West Virginia University annually awards about 1,500 graduate assistantships supported from state appropriations, federal funds, private grants, and contracts; and about 200 fellowships and traineeships derived from federal agencies and from industries and private foundations. Fellowships are awarded on the basis of academic merit and require no service in return. Graduate fellows are expected to spend full time in pursuit of their studies, but may teach to the extent that the particular degree program requires. Most traineeships, provided through institutional grants, are also for full-time study without scheduled duties.

All graduate assistants and fellows are required to be full-time (nine hours or more) graduate students. The individual is primarily a student and secondarily an employee. Tuition and registration fees generally are remitted (see below). Awards are made by degree programs or by the nonacademic unit where service is to be rendered. Applications should be made to the dean or director concerned or to the chairperson of the program in which the graduate work will be pursued. Early application is strongly recommended. Students may hold only one appointment as a graduate assistant per term.

Remission of Fees

Students appointed as graduate assistants are eligible to apply for remission of tuition and certain fees. Tuition and some fees are generally remitted or paid for fellows and trainees. All students must pay the Mountainlair construction, radio station, and Daily Athenaeum fees, but graduate assistants, fellows, and trainees are granted the option with regard to the remainder of the institution activity fee.

Students may not hold more than the total equivalent of one assistantship. This rule applies even if the appointment comes from several sources (e.g., graduate teaching assistantship, graduate research assistantship, graduate administrative assistantship, graduate residence hall assistantship, and/or teaching fellow).

Terms of Employment

Stipends for graduate assistantships are generally stated in terms of nine- or twelve-month appointments and require service to the institution. The term of service normally runs from August 15 to May 15 for nine-month appointments or from August 15 to December 31 for the fall semester or January 1 until May 15 for spring semester. The total hours of work, as well as the particular days of service (e.g., weekends and/or holidays) required, must be made clear to the student by the appropriate graduate department at the time of assigning the assistantship.

Graduate Teaching Assistant

A person who holds a graduate teaching assistantship is obligated to the extent of teaching two three-hour courses per semester, or for the equivalent in laboratory classes, or for other forms of departmental assistance, except research assistance, amounting to a minimum of 12 clock hours per week. These assistantships are generally registered to academic units.

Graduate Research Assistant

A graduate research assistant is a graduate student whose duties consist of assisting in the research of a faculty member with an obligation of not less than 15 or more than 20 clock hours per week in any semester.

Graduate Administrative Assistant

A student employed as a graduate administrative assistant works part time in one of the administrative offices of WVU. Assistantships obligate the student to no less than 12 or more than 20 hours of work per week in any semester.

Graduate Residence Assistants

(Department of Housing and Residence Life)

Resident assistant positions are available for single undergraduate and graduate students. There are nine University-supervised residence halls which house approximately 3,600 first-year and upper-class residents. Resident assistants are required to provide educational, cultural, recreational, and social opportunities and programs for their residents. Remuneration for resident assistant positions is room, board, and a monthly stipend. Graduate students may also receive a tuition waiver for a few, specialized, live-in positions.

To obtain further information about the resident assistant recruitment and selection process, write to the assistant director for residence life, G-106, Bennett Tower, P.O. Box 6430, West Virginia University, Morgantown, WV 26506-6430.

Advising Center Assistant

Assistantships are available through the University Advising Center for students who have been admitted to a graduate program. Those who are accepted will provide academic advising services to freshman and sophomore students. A stipend is paid and the graduate student is eligible to apply for waiver of tuition and registration fees. Contact the director of the University Academic Services Center for information and applications.

Teaching Fellow

A teaching fellow is an advanced graduate student, usually in a doctoral program, who would qualify for a junior faculty position if that person were not a graduate student at WVU. A teaching fellow may be given major responsibilities for the design and/or operation of a course, whereas such responsibility is not placed on a graduate teaching assistant.

Policy On Remuneration for Graduate Assistants

The following principles apply to remuneration for duties performed by graduate assistants.

1. Graduate Assistant (other than GRHA) salaries must meet or exceed the University minimum on a 9-month equated basis as set by the Office of Academic Affairs, with the minimum salary for doctoral (post-master's) students set higher than the minimum for master's level students. The minimum salary in effect for 1997-98 is at the rate of \$612 per month which amounts to \$2754 for a semester, \$5508 for 9-months, and \$7344 for 12-months. The remuneration in effect for 1997-98 for GRHA is room, some board, and \$150 per month.

International students must meet financial support criteria (currently about \$9120 for 12 months in addition to tuition and fee charges) from an assistantship and/or other sources in order to qualify for a Certificate of Eligibility (I-20 or IAP-66) and, subsequently, a student visa.

2. Academic and other units are required to establish discipline-based salary ranges by student level (i.e., master's, doctoral, first-professional) for graduate assistants funded in their units.

Swiger Fellowships

Arlen G. and Louise Stone Swiger have been special benefactors to WVU in their establishment of this fellowship program through the West Virginia University Foundation, Inc. Both were WVU graduates. Arlen G. Swiger, a successful New York attorney, bequeathed to the University half of his estate which became available to the WVU Foundation upon the death of his widow, Louise Stone Swiger. **These fellowships are open**

to doctoral students. Selection is competitive on the basis of academic merit. Application should be made early in the year preceding the year of anticipated enrollment in a doctoral program. Inquiries should be directed to the Office of Graduate Education.

W. E. B. DuBois Fellowships

Dr. William Edward Burghardt DuBois was born in 1868. He was educated at Fisk University and received his Ph.D. from Harvard University in 1896. Dr. DuBois was one of the founders of the National Association for the Advancement of Colored People and the Pan-African Congress Movement. Author of many historical and analytical studies of American and African society, his example provides a standard of excellence for scholarship in any discipline and an especially inspiring model for black scholars. Because of the achievements of Dr. DuBois, West Virginia University has named this fellowship program in his honor. The fellowships are open to black graduate and professional students who are native or naturalized U.S. citizens. Selection is competitive on the basis of academic merit and potential for success in graduate or professional study. Inquiries should be directed to the graduate or professional program of choice or to the Office of Graduate Education.

Veterans Educational Assistance

The educational assistance program administered by the federal Department of Veteran Affairs, under which a potentially eligible veteran may be entitled to benefits, is largely dependent upon when the individual served on active duty. DVA administers 11 educational assistance programs and the basic eligibility criteria may vary. Generally, only DVA can determine an applicant's eligibility for educational assistance. For more information, contact the nearest DVA office; in West Virginia, the DVA is located at 640 4th Avenue, Huntington, WV 25701; telephone: 1-800-827-1000.

Loans and Employment

Information and guidance on loans for graduate students are available in the Student Financial Aid Office, Mountainlair. On-campus employment opportunities can be investigated at the Student Financial Aid Office in the Mountainlair and the Human Resources Office in Knapp Hall. A summer and part-time job service is operated by the WVU Career Services Center in the Mountainlair. Its purpose is to place students in part-time or temporary jobs in Morgantown and the surrounding area.

Fellowships within the United States and Abroad

Students are encouraged to submit applications to outside agencies that support graduate-level study and research. Among the opportunities available are programs sponsored by the Fulbright-Hays Training Grants, the National Science Foundation, the Marshall Scholarship Program, the National Institutes of Health, the Oak Ridge Associated Universities, and the Rhodes Scholarships. Students should contact the Office of Sponsored Programs for assistance in applying for these programs. In most cases, this office will refer the student to a faculty advisor who can provide detailed assistance. Several national agencies publish information about fellowships and financial aid opportunities for graduate students. Individuals interested in reviewing this information should consult the personnel at the reference desk of the Charles C. Wise, Jr. Library.

Academic Integrity/Dishonesty

The academic development of students and the overall integrity of the institution are primary responsibilities of WVU. Academic dishonesty is condemned at all levels of life, indicating an inability to meet and face issues and creating an atmosphere of mistrust, disrespect, and insecurity. In addition, it is essential in an academic community that grades

accurately reflect the attainment of the individual student. Faculty, students, and administrators have shared responsibilities in maintaining the academic integrity essential for the University to accomplish its mission.

Students should act to prevent opportunities for academic dishonesty to occur, and in such a manner to discourage any type of academic dishonesty.

Faculty members are expected to remove opportunities for cheating, whether related to test construction, test confidentiality, test administration, or test grading. This same professional care should be exercised with regard to oral and written reports, laboratory assignments, and grade books.

Deans and department chairpersons are expected to acquaint all faculty with expected professional behavior regarding academic integrity, and to continue to remind them of their responsibility. Deans and department chairpersons shall assist faculty members and students in handling first-offense cheating allegations at the lowest possible level in the University, and with discretion to prevent damage to the reputation of any person who has not been found guilty in the prescribed manner.

Each member of the teaching faculty and all other WVU employees, including but not limited to assistants, proctors, office personnel, custodians, and public safety officers, shall promptly report each known case of academic dishonesty to the appropriate supervisor, department chairperson, or dean of the college or school concerned, and to the Office of Judicial Programs, Office of Student Life.

Definition

West Virginia University expects that every member of its academic community shares the historic and traditional commitment to honesty, integrity, and the search for truth. Academic dishonesty is defined to include but is not limited to any of the following:

1. **Plagiarism:** To take and pass off as one's own the ideas, writings, artistic products, etc. of someone else; for example, submitting, without appropriate acknowledgment, a report, notebook, speech, outline, theme, thesis, dissertation, or other written, visual, or oral material that has been knowingly obtained or copied in whole or in part, from the work of others, whether such source is published, including (but not limited to) another individual's academic composition, compilation, or other product, or commercially prepared paper.
2. **Cheating** and dishonest practices in connection with examinations, papers, and projects, including but not limited to:
 - a. Obtaining help from another student during examinations.
 - b. Knowingly giving help to another student during examinations, taking an examination or doing academic work for another student, or providing one's own work for another student to copy and submit as his/her own.
 - c. The unauthorized use of notes, books, or other sources of information during examinations.
 - d. Obtaining without authorization an examination or any part thereof.
3. **Forgery, misrepresentation or fraud:**
 - a. Forging or altering, or causing to be altered, the record of any grade in a grade book or other educational record.
 - b. Use of University documents or instruments of identification with intent to defraud.
 - c. Presenting false data or intentionally misrepresenting one's records for admission, registration, or withdrawal from the University or from a University course.
 - d. Knowingly presenting false data or intentionally misrepresenting one's records for personal gain.
 - e. Knowingly and unethically furnishing the results of research projects or experiments.
 - f. Knowingly furnishing false statements in any University academic proceeding.

Academic dishonesty includes plagiarism; cheating and dishonest practices in connection with examinations, papers, and projects; and forgery, misrepresentation, and

fraud. Some cases of forgery, misrepresentation, or fraud which occur outside the context of courses or academic requirements may be referred directly to the University Committee on Student Rights and Responsibilities by any member of the University community. In such cases, the University Committee on Student Rights and Responsibilities will arrange a hearing following the procedure outlined in Step 3 within 15 calendar days of receipt of the charges.

Hearing Procedure Steps

Step 1. If a student is charged with academic dishonesty, the instructor will contact the student in person and/or notify the student in writing of the specifics of the charge within 15 calendar days of the discovery of the offense. The student must respond within five calendar days of the receipt of the notification. If the instructor determines the student is guilty, the maximum penalties the instructor may administer are exclusion from the course, a lower grade, and/or an unforgivable F (not eligible for D/F repeat policy) in the course. The instructor and/or the department chairperson also may recommend to the dean of the college in which the course is offered that additional penalties be imposed on the student. At the discretion of the faculty member or department chairperson, in cases where there is written admission of guilt by the student, the case may be satisfactorily resolved at the departmental level. Whenever a penalty is administered, the facts of the case shall be reported in writing to the dean of the college or school and a copy forwarded to the Office of Judicial Programs for the permanent records. In cases wherein academic dishonesty occurs in a college or school other than that in which the student is enrolled, the results of the case shall be reported to the dean of the college or school in which the student involved is enrolled.

Step 2. If the student denies guilt, if the student believes the penalty imposed in Step 1 is unjust, or if the instructor and/or department chairperson determines the penalties available at Step 1 are insufficient for a specific act, the dean of the college or school in which the course is offered shall be notified in writing of the specifics of the case. The dean shall then implement the following steps within 15 calendar days of receipt of notification:

Step 3. If the student wishes to appeal the decision of the dean, the appeal must reach the University Committee on Student Rights and Responsibilities within 30 calendar days of the student's receipt of the dean's decision. The University Committee on Student Rights and Responsibilities will arrange a hearing within 15 calendar days using the following procedures:

The University Committee on Student Rights and Responsibilities will reach a decision within seven days of the hearing. If the University Committee on Student Rights and Responsibilities finds the student guilty, it will determine the penalty it deems appropriate under the circumstances and inform all parties involved. The penalty imposed cannot be more severe than the penalty imposed by the dean.

Step 4. Only sanctions of suspension or dismissal invoked or upheld by the University Committee on Student Rights and Responsibilities may be appealed to the President or his/her designee. Such appeals must reach the President's Office within 30 calendar days after receipt of written notice of the decision of the University Committee on Student Rights and Responsibilities. The decision of the President or the President's designee is final.

Notes on the fee charts on the following pages:

[†] Nine credit hours are considered the usual maximum at WVU.

*Special fees include Mountainlair (\$58), Daily Athenaeum (\$7), radio station (\$5), health, counseling service, and programs (\$106), transportation (\$51), student affairs (\$31), and athletic (\$46).

Fees listed are accurate as of January 1, 1998; however, fees are subject to change without notice. Contact the Office of Admissions and Records for more current information.

Fees per Credit Hour for Graduate Studies

Credit Hours	Resident			Non-Resident		
	Tuition	Special Fees*	Total	Tuition	Special Fees*	Total
0	\$107	\$34	\$141	\$391	\$34	\$425
1	107	34	141	391	34	425
2	214	68	282	782	68	850
3	321	102	423	1,173	102	1,275
4	428	136	564	1,564	136	1,700
5	535	170	705	1,955	170	2,125
6	642	204	846	2,346	204	2,550
7	749	238	987	2,737	238	2,975
8	856	272	1,128	3,128	272	3,400
*9	941	304	1,245	3,499	304	3,803

Higher Education Resource Fund

This fee is paid by graduate students in the Colleges of Business and Economics and Engineering and Mineral Resources.

Credit hours	Resident	Non-Resident
0	\$18	\$25
1	18	25
2	36	50
3	54	75
4	72	100
5	90	125
6	108	150
7	126	175
8	144	200
*9	155	225

Fees per Credit Hour for Health Sciences Graduate Studies

Credit Hours	Resident				Non-Resident			
	Tuition	Special Fees	Health Prof.	Total	Tuition	Special Fees	Health Prof.	Total
0	\$72	\$34	\$68	\$174	\$219	\$34	\$269	\$522
1	72	34	68	174	219	34	269	522
2	144	68	136	348	438	68	538	1,044
3	216	102	204	522	647	102	807	1,566
4	288	136	272	691	876	136	920	2,088
5	360	170	340	870	1,095	170	1,076	2,610
6	432	204	408	1,044	1,314	204	1,380	3,132
7	504	238	476	1,218	1,533	238	1,610	3,654
8	576	272	544	1,392	1,752	272	1,840	4,176
9	635	304	612	1,551	1,955	304	2,063	4,677

Master of Public Health Program

Resident				Non-Resident			
Special		Health	Total	Special		Health	Total
Tuition	Fees	Prof.		Tuition	Fees	Prof.	
\$72	\$34	\$97	\$203	\$219	\$34	\$326	\$579

Additional Fees for Pharmacy

Hours	Resident		Non-Resident	Resident		Non-Resident
	Education Fee			Health Professions Fee		
0	\$3.00	\$12		\$85		\$309
1	3.00	12		85		309
2	6.00	24		170		618
3	9.00	36		255		927
4	12.00	48		340		1,236
5	15.00	60		425		1,545
6	18.00	72		510		1,854
7	21.00	84		595		2,136
8	24.00	96		680		2,472
9	25.00	100		759		2,773

PHARM D

Resident	Non-Resident
\$117.00	\$402.00
117.00	402.00
234.00	804.00
351.00	1,206.00
468.00	1,608.00
585.00	2,010.00
702.00	2,412.00
819.00	2,814.00
936.00	3,216.00
1,046.00	3,614.00

Other Fees

Application for admission (Dentistry and Medicine)	\$45
Application for admission (Law or Graduate Studies)	45
Diploma replacement	20
Graduation	30
(All students pay this fee at the beginning of the term or session in which they expect to complete their degrees.)	
Late registration (nonrefundable)	30
(Charged to students who do not register on the registration days set forth in the University Calendar.)	
Professional engineering degree (includes \$20.00 graduation fee)	35
Late penalty fee	20
Student identification card replacement	20
Student record fee	5
Official transcript	5
Official letter (statement of degree/grade-point average)	5
Course descriptions	5
Priority service on above	8

Part 4 Programs and Courses

Schedule of Courses

Before the opening of each term and the summer terms, a *Schedule of Courses* is printed, announcing the courses that will be offered by the colleges and schools of WVU.

Plan for Numbering Courses

For convenience, each course of study is designated by the name of the department in which it is given and by the number of that course. The plan for numbering courses is as follows:

Courses 1-99: Courses intended primarily for freshmen and sophomores.

Courses 100-199: Courses intended primarily for juniors and seniors.

Courses 200-299: Courses for advanced undergraduate students and selected graduate students. No more than 40 per cent of the credits counted for meeting requirements for a graduate degree can be at the 200 level.

Courses 300-399: Courses for graduate students, students in professional programs leading to a doctorate, and selected advanced undergraduate students. Undergraduates in any class carrying a 300-level course number must have a 3.0 cumulative grade point average and written approval on special forms from the course instructor and the student's advisor. Seniors within 12 semester hours of graduation may, with prior approval of their advisors, enroll in 300-level graduate courses for graduate credit.

Courses 400-499: Courses for graduate students only.

In summary, 200-level courses are intended primarily to serve undergraduate students; 300-level courses are intended primarily to serve introductory course needs for graduate programs.

NOTE: Graduate degree credit-hour requirements must include at least 60 per cent at the 300 and 400 level.

Graduate Level Common Course Numbers and Descriptions

(as approved by the Faculty Senate)

Course 391 *Advanced Topics*. Variable 1-6 hr. PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

Course 397 *Research*. Variable 1-15 hr. PR: Consent. Research activities leading to a thesis, problem report, research paper, or equivalent scholarly project.

Any school, college, department, or division may elect to offer these courses for its students. With the approval of the assistant vice president for curriculum and instruction, these courses may be graded S or U.

Courses 491 and 497: Courses 491 *Advanced Study* and 497 *Research* are approved for University-wide use by any academic unit. Courses numbered 491 and 497 may be graded S or U.

Courses 492-495: Courses are approved by the assistant vice president for curriculum and instruction. Approved requests are forwarded to the Office of Admissions and Records for entry into the WVU *Schedule of Courses*.

490. *Teaching Practicum*. I and II. 1-3 hr. PR: Consent. Supervised practice in college teaching of _____ (Subject matter determined by department/division/college/school offering the course.)

Note: This course is intended to insure that graduate assistants are adequately prepared and supervised when they are given college teaching responsibility. It also provides a mechanism for students not on assistantships to gain teaching experience. Courses numbered 490 are graded S/U.

491. *Advanced Study*. I, II, S. 1-6 hr. PR: Consent. Investigation in advanced topics which are not covered in regularly scheduled courses. Study may be independent or through specially scheduled lectures.

Note: This course is intended to be helpful in pioneering new courses prior to requesting formal approval through the Senate Curriculum Committee and the full Faculty Senate (no later than the semester following the second offering of a particular Special Topics course) and to allow distinguished visitors whose stay will be a month or longer to instruct in their own fields of specialty.

492. *Directed Study*. I, II, S. 1-6 hr. Directed study, reading, and/or research.
493. *Special Topics*. I, II, S. 1-6 hr. A study of contemporary topics selected from recent developments in the field.
494. *Special Seminars*. I, II, S. 1-6 hr. Special seminars arranged for advanced graduate students.
495. *Independent Study*. I, II, S. 1-6 hr. Faculty-supervised study of topics not available through regular course offerings.
496. *Graduate Seminar*. 1 hr. PR: Consent. It is anticipated that each graduate student will present at least one seminar to the assembled faculty and graduate student body of his/her program.
Note: This course is intended to provide a mechanism for graduate students to give their "maiden speech" in their chosen discipline. Grading will be S/U.
497. *Research*. 1-15 hr.
498. *Thesis*. 2-4 hr. PR: Consent.
Note: This is an optional course for programs that believe that this level of control and supervision is needed during the writing of students' reports, theses, or dissertation.
499. *Colloquium*. 1-6 hr. PR: Consent. For graduate students not seeking course work credit but who wish to meet residence requirements, use the University's facilities, and participate in its academic and cultural programs.
Note: Graduate students who are not actively involved in course work or research are entitled, through enrollment in his/her department's 499 Graduate Colloquium, to consult with graduate faculty, participate in both formal and informal academic activities sponsored by his/her program, and retain all of the rights and privileges of duly enrolled students. Grading is S/U; colloquium credit may not be counted against credit requirements for masters' programs.

General Comment

Graduate Council policy requires that any student in a master's program has a minimum of 24 hours of "regular" course work: **"...a minimum of 24 hours of course work other than thesis credit is standard and a minimum of 30 total hours is also standard."**

Abbreviations Used in Course Listings

- I: a course given in the first (fall) term.
- II: a course given in the second (spring) term.
- I, II: a course given each term.
- I and II: a course given throughout the year.
- Yr: a course continued through two terms.
- S: a course given in the summer.
- Hr: credit hours per course.
- Lec: lecture period.
- Rec: recitation period.
- Lab: laboratory period.
- Conc: concurrent registration required.
- PR: prerequisite.
- Coreq: corequisite.
- Consent: consent of instructor required.
- CR: credit but no grade.

An asterisk (*) following credit hours listed as variable indicates that the course normally carries three credit hours. Exceptions are made only in emergencies and must be approved by the departmental chair and by the professor teaching the course.

College of Agriculture, Forestry and Consumer Sciences

Rosemary R. Haggett, Ph.D., Dean; Director of West Virginia Agricultural and Forestry Experiment Station

Kerry S. Odell, Ph.D., Associate Dean for Academic Affairs and Development

Jack E. Coster, Ph.D., Interim Associate Director, West Virginia Agricultural and Forestry Experiment Station

The College of Agriculture, Forestry and Consumer Sciences is comprised of five divisions: animal and veterinary sciences, family resources, forestry, plant and soil sciences, and resource management. The college's faculty and staff are located in four buildings on the Evansdale campus, in one building on the downtown campus, on farms administered by the College of Agriculture, Forestry and Consumer Sciences in Kearneysville, Morgantown, Reedsville, Union, and Wardensville, and at the University Forest on nearby Chestnut Ridge. The College also operates the West Virginia University Child Development Laboratory (Nursery School).

Students study many different subjects concerned with human behavior, plants, animals, and microorganisms. Curricula in the college stress biological and chemical sciences, applied ecology, fabricated structures, and relationships among people as they live and work in a wide variety of settings. Courses offered in the College give students a comprehensive understanding of the basic elements that interrelate with and affect our environment.

The College of Agriculture, Forestry and Consumer Sciences sponsors research via an organizational structure called the West Virginia Agricultural and Forestry Experiment Station. The Experiment Station is the mechanism through which most research proposals are generated, evaluated, approved, and funded. The University controls extensive lands, which are administered by the College, with specific areas set aside for research and teaching purposes in dairy, general livestock, poultry, forestry, wildlife management, horticulture, general agronomy, entomology, and soils. The required instruction and analytic work is performed in the classrooms and laboratories of the University's facilities.

College of Agriculture, Forestry and Consumer Sciences Graduate Programs

Agricultural Education	M.S.
Agricultural and Resource Economics	M.S.
Agricultural Sciences	Ph.D.
<i>Animal and Food Science, Plant and Soil Science</i>	
Animal and Veterinary Sciences	M.S.
<i>Animal Sciences, Breeding, Food Sciences, Nutrition, Physiology, Production</i>	
Family and Consumer Sciences	M.S.
<i>Child Development and Family Studies, Human Nutrition</i>	
Forest Resources Science	Ph.D.
<i>Forest Resources Management, Wildlife and Fisheries Management, Wood Science</i>	
Forestry	M.S.F.
Genetics and Developmental Biology	M.S., Ph.D.
Natural Resource Economics	Ph.D.
Plant and Soil Sciences	M.S.

<i>Agronomy, Entomology, Environmental Microbiology, Horticulture, Plant Pathology</i>	
Recreation and Parks Management	M.S.
Reproductive Physiology	M.S., Ph.D.
Wildlife and Fisheries Resources	M.S.

The College of Agriculture, Forestry and Consumer Sciences currently offers five doctoral programs:

- **Ph.D. in Agricultural Sciences.** Doctoral students may choose from a major in either animal and food sciences or plant and soil sciences.
- **Ph.D. in Forest Resource Sciences.** Doctoral students may choose from the following majors: forest resource management, wildlife and fisheries management, or wood science.
- **Ph.D. in Natural Resource Economics.** Doctoral students may choose from the following majors: natural resource and environmental economics, commodity market analysis, modeling and forecasting, or international agricultural and rural resource development.

The College directs two interdisciplinary doctoral programs.

- **Ph.D. in Genetics and Developmental Biology.** Doctoral students may select from 16 areas of emphasis related to human, plant, and animal genetics, and developmental biology.
- **Ph.D. in Reproductive Physiology.** Doctoral students may select courses in biochemistry, developmental embryology, endocrinology, reproductive physiology, statistics, and physiology.

The College of Agriculture, Forestry and Consumer Sciences offers many programs at the master's level. Students can choose from the following majors for a master's degree: agricultural and resource economics, agricultural education, animal sciences, family resources, forestry, plant sciences, recreation and parks management, or wildlife and fisheries management. In addition, students may choose to pursue a master of science in the interdisciplinary programs in genetics and developmental biology or reproductive physiology.

For additional information concerning any of the graduate programs in Agriculture, Forestry and Consumer Sciences contact the Associate Dean and Coordinator of Graduate Studies, College of Agriculture, Forestry and Consumer Sciences, P.O. Box 6108, West Virginia University, Morgantown, WV 26506-6108; Telephone (304) 293-2691.

General Admission Requirements and Information

Regular: A regular graduate student is a degree-seeking student who meets all of the criteria for regular admission to a program of his/her choice. The student must possess a baccalaureate degree from a college or university, have at least a grade-point average of 2.75 on a 4.0 scale (or an average of 3.0 or higher for the last 60 credit hours), meet all the criteria established by the degree program, and be under no requirements to make up deficiencies.

The student must:

1. Have an adequate academic aptitude at the graduate level as measured by the Graduate Record Examination (GRE), or the New Medical College Admissions Test (New MCAT).
2. Provide three letters of reference from persons acquainted with the applicant's professional work, experience, or academic background.
3. Submit a written statement of 500 words or more indicating the applicant's goals and objectives relative to receiving a graduate degree.

4. International students have the additional requirement to submit a minimum score of 550 on the TOEFL examination if their native language is not English.

See the specific graduate programs for additional requirements.

Provisional: A student may be admitted as provisional when the student possesses a baccalaureate degree but clearly does not meet the criteria for regular admission. The student may have incomplete credentials, deficiencies to make up, or may have a promising undergraduate scholastic record that is less than the 2.75 grade-point average or an average of 3.0 or higher in the last 60 credit hours required for regular admission.

Non-Degree: A non-degree student is a student not admitted to a program. Admission as a non-degree student does not guarantee admission to any course or program. The reasons for non-admission may be late application, incomplete credentials, scholarship deficiencies, or lack of a degree objective. Even though a non-degree student has not been admitted to a graduate program, an academic unit may allow a non-degree student admission. A student must present evidence of a baccalaureate degree and obtain a 2.5 grade-point average on the first 12 credit hours of course work and maintain this average as long as enrolled. A maximum of 12 credit hours of work as a non-degree student may be applied to a graduate degree if the student is later accepted into a graduate program. To be eligible to enter a degree program, the student must maintain a minimum of a 3.0 grade-point average on all course work taken since admission as a graduate student.

Graduate Faculty

* Indicates associate membership in the graduate faculty.

† Indicates regular membership in the graduate faculty.

Animal and Veterinary Sciences

Professors

*William E. Collins, Ph.D. (U. Wisc.). Bovine reproduction.

†Robert A. Dailey, Ph.D. (U. Wisc.). Reproductive physiology.

†William H. Hoover, Ph.D. (Penn. St. U.). Animal nutrition.

†E. Keith Inskeep, Ph.D. (U. Wisc.). Reproductive physiology.

†Paul E. Lewis, Ph.D. (WVU). Reproductive physiology.

†Ronald A. Peterson, Ph.D. (Mich. St. U.). Nutrition. Physiology-poultry.

†Edward C. Prigge, Ph.D. (U. Maine). Animal nutrition.

†John E. Warren, Ph.D. (U. of Md.). Director. Reproductive Physiology.

Associate Professors

†Hillar Klandorf, Ph.D. (U. Edinburgh). Poultry physiology.

*Phillip I. Osborne, Ph.D. (Clemson U.). Extension Specialist. Livestock marketing and production.

†Richard Russell, Ph.D. (Iowa St. U.). Animal nutrition.

*Wayne R. Wagner, Ph.D. (Colo. St. U.). Extension Specialist. Animal breeding and genetics.

Assistant Professors

†P. Brett Kenney, Ph.D. (Kansas St. U.). Meat Science.

†John Killifer, Ph.D. (Ore. St. U.). Biochemistry. Molecular genetics.

Family and Consumer Sciences

Professors

†Wanda F. Franz, Ph.D. (WVU). Human development, Cognitive development theory.

†Mary K. Head, R.D., Ph.D. (Purdue U.). Experimental foods, Applied human nutrition, Food and dietary evaluation.

*Nora M. MacDonald, M.S. (Iowa St. U.). Apparel design, Clothing for special needs, Fashion merchandising.

†M. Zafar Alam Nomani, Ph.D. (Rutgers U.). Dietary fiber, Cholesterol, Protein and energy metabolism, Nutritional assessment, International nutrition.

Associate Professors

- *Marian Beth Liddell, Ed.D. (WVU). Curriculum, Instruction, Supervision.
- *Charlotte Nath, Ed.D. (WVU). Adjunct.
- *Richard Strasberger, Ed.D. (WVU). Adjunct. Special education, Parenting education.
- †Bobbie Gibson Warash, Ed.D. (WVU). Preschool curriculum.

Assistant Professors

- †Hazel A. Bourne Hiza, Ph.D. (Harvard U.). Applied human nutrition, Pregnancy and nutrition.
- *Chet Johnson, M.D. (U. Kansas). Adjunct. Child development.
- *Shirley Lazorchak, Ph.D. (Ohio State). Fashion merchandising, Historic costume.
- †Carol Markstrom, Ph.D. (Utah St. U.). Family, Adolescents, Social contexts.
- *Dottie D. Rauch, M.Ed. (Penn. St. U.). Family resource management.
- *Susan Rodman, Ed.D. (WVU). Adjunct. Statistics.

Lecturer

- *Betty Forbes, M.A. (WVU).

Forestry Professors

- *Jack E. Coster, Ph.D. (Tex. A&M U.). Forestry, Entomology.
- †Ray R. Hicks, Jr., Ph.D. (SUNY). Forest Management. Forest ecology, Forest pest management.
- †David E. Samuel, Ph.D. (WVU). Wildlife and Fisheries Management. Policy and administration, Wildlife attitudes, Hunter education.
- †Stanislaw Jan Tajchman, Ph.D. (U. Munich). Forest Management. Forest meteorology.
- †Robert C. Whitmore, Ph.D. (B. Young U.). Wildlife and Fisheries Management. Avian ecology, Quantitative ecology.

Associate Professors

- †James P. Armstrong, Ph.D. (SUNY). Wood Science. Physical properties and hardwood drying.
- *William N. Grafton, M.S.F. (WVU). Extension specialist, Wildlife.
- †Curt C. Hassler, Ph.D. (VPI&SU). Leader, Appalachian Hardwood Center. Wood Science. Harvesting, Quantitative methods.
- †Steven J. Hollenhorst, Ph.D. (Ohio St. U.). Recreation and Parks. Wilderness management.
- Joseph McNeel, Ph.D. (VPI & SU). Director. Forest Engineering/Forest operation. Simulations.
- †Steven W. Selin, Ph.D. (U. Ore.). Recreation and parks, Parks and tourism management.

Assistant Professors

- R. Bruce Anderson, Ph.D. (VPI & SU). Wood Science, Forest products technology.
- †Ben E. Dawson-Andoh, Ph.D. (U. British Columbia). Wood science. Wood chemistry and biodeterioration.
- †John Edwards, Ph.D. (Clemson U.). Wildlife and Fisheries management. Upland ecology.
- †Mary Ann Fajvan, Ph.D. (U. Maine). Forest management, Quantitative silviculture.
- *Rory F. Fraser, Ph.D. (PSU). Forest management. Forest economics and international trade.
- †Linda S. Gribko, Ph.D. (WVU). Forest management. Integrated resources management and planning. Geographic Information Systems.
- †Kyle J. Hartman, Ph.D. (U. of MD). Wildlife and fisheries management. Fish ecology.
- Elmer Lang, Ph.D. (VPI & SU). Wood Science, Wood mechanics, Wood-based composite materials.
- *Patricia Mazik, Ph.D. (Memphis State U.). Adjunct. Cooperative Fish and Wildlife Research Unit. Fish physiology.
- †Michael Schuett, Ph.D. (U. of MN). Recreation and parks. Recreation resource management, environmental interpretation and education.
- †Theresa Wang, Ph.D. (U. of MN). Recreation and parks. Recreation resource management, environmental interpretation and education.
- †Petra B. Wood, Ph.D. (U. Fla.). Adjunct. Cooperative Fish and Wildlife Research Unit. Wildlife ecology.

Genetics and Developmental Biology

Professors

- Linda Butler, Ph.D. (U. Ga.). Entomology. Forest entomology, Pest management.
Nyles Charon, Ph.D. (U. Minn.). Medical bacteriology, Genetics and physiology of spirochetes.
Walter J. Kaczmarczyk, Ph.D. (Hahnemann Med. Col.). Biochemical genetics, Biochemistry.
Edward C. Keller, Ph.D. (Penn. St. U.). Ecological genetics, Population genetics.
Gregory W. Konat, Ph.D. (U. Odense). Myelinogenesis, Chromatin and gene expression.
Daniel M. Lewis, Ph.D. (WVU). Adjunct. Immunology, Mechanism of immunological reactions in the lung.
Joseph P. Morton, Ph.D. (Mont. St. U.). Ecological, developmental and molecular studies in fungi.
Joginder Nath, Ph.D. (U. Wisc.). Chairperson. Cytogenetics, Evolution, Mutagenetics.
Tong-man Ong, Ph.D. (Illinois St. U.). Adjunct. Mutagenesis toxicology.
Robert S. Pore, Ph.D. (U. Cal.). Mycology, Pathobiology, Mycoses.
Donald A. Sens, Ph.D. (U. SC). Pathology, Microbiology, Molecular genetics.
Mary Ann Sens, M.D., Ph.D. (U. SC). Perinatal pathology.
William Sorenson, Ph.D. (U. Tx.). Adjunct. Role of fungi in occupational lung disease.
William V. Thayne, Ph.D. (U. Illinois). Statistics, Statistical genetics.
Knox Van Dyke, Ph.D. (St. Louis U.). Chemiluminescence in human cells, Effects of anti-inflammatory drugs on chemiluminescence.
William Wallace, Ph.D. (WVU). Adjunct. Surface spectroscopy and genetic toxicology of respirable mineral and organic particles.
Sharon L. Wenger, Ph.D. (U. Pitt.). Clinical cytogenetics.

Associate Professors

- Keith Garbutt, Ph.D. (U. Wales). Population genetics.
Ann Hubbs, Ph.D. (Co. St. U.). Adjunct. Veterinary toxicologic pathology, Mechanisms of toxic injury.
Hillar Klandorf, Ph.D. (U. Edinburgh). Endocrinology.
Dennis O. Overman, Ph.D. (U. Mich.). Teratology, Organ culture.
Jeanine Strobl, Ph.D. (Geo. Wash. U.). Estrogen receptor mechanisms.
David B. Yelton, Ph.D. (U. Mass.). Microbial genetics, Bacteriophage, Molecular genetics.

Assistant Professors

- Rajeev Arora, Ph.D. (U. Wisc.). Perturbations related to low temperature stress.
Brad Hillgartner, Ph.D. (Mich. St. U.). Nutritional control of gene expression, Thyroid hormone action.
Wei-Shau Hu, Ph.D. (U.C.-Davis). Retrovirus recombination and replication, Mechanisms of oncogene transduction, Human gene therapy.
Daniel Panacionne, Ph.D. (Purdue U.). Gene cloning, Gene transfer.
Vinay Pathak, Ph.D. (U.C.-Davis). Retroviral genetics, Isolation of anitoncogenes.
Mohamdi A. Sarkar, Ph.D. (Virg. Comm. U.). Etiology of uterine and bladder cancers.
James Sheil, Ph.D. (U. Ky.). Immunology, Mechanisms of cytotoxic T lymphocyte-mediated antigen recognition and effector function.
John H. Todd, Ph.D. (U. SC). Biopathology.

Plant and Soil Sciences

Professors

- †James W. Amrine, Jr., Ph.D. (Iowa St. U.). Entomology. Medical entomology, Apiculture, Biological control.
†Barton S. Baker, Ph.D. (WVU). Director. Agronomy. Forage crops.
†John A. Balasko, Ph.D. (U. Wisc.). Agronomy. Forage crops.
*John F. Baniecki, Ph.D. (U. Ariz.). Extension. Plant Pathology. Plant disease identification and control.
†Bradford C. Bearce, Ph.D. (U. Calif.). Horticulture. Florist and nursery crops.
†Alan R. Biggs, Ph.D. (PSU). Plant pathology, Tree fruits.
†Gary K. Bissonnette, Ph.D. (Mont. St. U.). Environmental microbiology, Aquatic microbiology.
†William B. Bryan, Ph.D. (Iowa St. U.). Agronomy. Pastures.
†Linda Butler, Ph.D. (U. Ga.). Entomology. Forest entomology, Pest management, Lepidoptera.
†Henry W. Hogmire, Ph.D. (Mich. St. U.). Entomology. Tree fruit entomology, Integrated pest management.

- †Walter J. Kaczmarczyk, Ph.D. (Hahnemann Med. C.). Genetics. Biochemical genetics.
- †William L. MacDonald, Ph.D. (Iowa St. U.). Plant Pathology. Forest and shade tree diseases.
- †Joseph B. Morton, Ph.D. (Mont. St. U.). Plant Pathology. Mycorrhizal interactions, Field crop diseases.
- †Joginder Nath, Ph.D. (U. Wisc.). Genetics. Cytogenetics, Evolution, Mutagenesis.
- †John C. Sencindiver, Ph.D. (WVU). Agronomy. Soil science, Soil genesis and classification, Land reclamation.
- †Jeffrey Skousen, Ph.D. (Tex. A&M U.). Extension specialist. Land reclamation.
- *Richard K. Zimmerman, Ph.D. (WVU). Extension, Plant Sciences. Plant sciences, Conservation.

Associate Professors

- †Alan J. Sexstone, Ph.D. (Mich. St. U.). Environmental Microbiology. Nutrient cycling and biodegradation of pollutants.

Assistant Professors

- †Rajeev Arora, Ph.D. (U. Wisc.). Horticulture, Plant physiology, Environmental stress.
- †John Hinz, Ph.D. (Iowa State). Weed science, Agronomy.
- †Louis McDonald, Ph.D. (U. KY). Soil chemistry.
- †Daniel Panacionne, Ph.D. (Purdue U.). Gene cloning, Gene transfer.

Resource Management Professors

- †Dale K. Colyer, Ph.D. (U. Wisc.). Production economics. Rural development.
- †Robert G. Diener, Ph.D. (Mich. St. U.). Agricultural and environmental technology, Electricity, Agricultural mechanization research.
- †Jerald J. Fletcher, Ph.D. (U. Cal.). Agricultural and resource economics, Resource economics.
- †Stacy A. Gartin, Ph.D. (Ohio St. U.). Agricultural education, Communications, Program planning, Leadership development, Adult education, Teaching methods.
- †Tesfa Gebremedhin, Ph.D. (Okla. St. U.). Agricultural and resource economics. Farm management, Agribusiness.
- *Alon Kvashny, Ed. D. (WVU). Landscape architecture. Site design, Landscape construction.
- †Walter C. Labys, Ph.D. (U. Nottingham). Mineral and energy economics. Commodity modeling.
- †Layle D. Lawrence, Ph.D. (LSU). Agricultural Education. Social science, Curriculum development, Teaching methods.
- *George W. Longenecker, M.F.A. (U. Illinois). Landscape Architecture. Plant identification, Planting design.
- †Tim T. Phipps, Ph.D. (U. Cal.). Agricultural and resource economics. Agricultural policy.
- †Peter V. Schaeffer, Ph.D. (U.S.C.). Director, Resource management. Regional science, Applied microeconomics.
- †Dennis K. Smith, Ph.D. (Penn. St. U.). Agricultural and resource economics. Rural development.
- †Thomas Torries, Ph.D. (Penn St. U.). Mineral and energy resource economics.

Associate Professors

- *Donald R. Armstrong, M.L.A. (Iowa St. U.). Landscape architecture. Site design, Design implementation.
- †Alan R. Collins, Ph.D. (Ore. St. U.). Agricultural and resource economics.
- †Gerard E. D'Souza, Ph.D. (Miss. St. U.). Agricultural and resource economics.
- *Alexander G. Karther, M.F.A. (U. Okla.). Landscape Architecture. Design communication, Design methodology.
- *Steven B. McBride, M.L.A. (U. Mass.). Landscape construction, Site design, Visual impact analysis.
- †Kerry S. Odell, Ph.D. (Ohio St. U.). Associate Dean. Rural education, Computer application, Leadership development.
- *Charles B. Yuill, M.L.A. (U. Mass.). GIS. Computer applications, Landscape planning.

Assistant Professors

- Gary J. Wingenback, Ph.D. (Iowa State). Computer applications. Leadership development.

Reproductive Physiology

Professors

*Robert Cochrane, Ph.D. (U. Wisc.). Adjunct. Reproduction in laboratory and fur animals.

*William E. Collins, Ph.D. (U. Wisc.). Endocrinology of bovine reproduction.

†Robert A. Dailey, Ph.D. (U. Wisc.). Neuroendocrine control of reproduction, Follicular development, Ovulation.

†Mark Gibson, M.D. (Case W. Reserve U.). Ovarian and uterine functions.

†Robert L. Goodman, Ph.D. (U. Pitt.). Neuroendocrine control of ovarian function.

†E. Keith Inskeep, Ph.D. (U. Wisc.). Uterine and ovarian prostaglandins in sheep and cattle.

†Paul E. Lewis, Ph.D. (WVU). Puberty, Postpartum and seasonal anestrus as limiting factors in reproduction.

†Michael G. Mawhinney, Ph.D. (WVU). Endocrine pharmacology and metabolism of male sex accessory tissues.

†Joginder Nath, Ph.D. (U. Wisc.). Genetics and evolution.

Associate Professor

†Hillar Klandorf, Ph.D. (U. Edinburgh). Poultry physiology.

Assistant Professor

†Jorges A. Flores (Geo. Wash. U.). Hypothalamic-pituitary-ovarian interactions.

Agricultural Education

Peter V. Schaeffer, Director, Division of Resource Management

Stacy A. Gartin, Graduate Program Coordinator

2052 Agricultural Sciences Building

Degree Offered: Master of Science

Prerequisites

The agricultural and environmental education faculty offers master's programs for persons desiring advanced study in teaching agriculture in public schools, communications and leadership, extension education, or environmental technology. Candidates for the master of science degree may be admitted on a regular or provisional basis. A student who does not have a B.S. in agriculture with a major in agricultural and environmental education may be required to complete undergraduate courses in agriculture and professional education if he or she plans to obtain certification to teach. Students in the curriculum take graduate courses in both technical and professional education.

Programs are planned to ensure that candidates develop competence in:

- communications and leadership
- design, operation and philosophy of agricultural and environmental education programs
- research and evaluation processes

In addition, students pursuing programs that emphasize agricultural and extension education will be expected to develop an understanding of teaching/learning processes whereas those emphasizing environmental technology will develop competence in technological aspects of environmental management.

All graduate courses offered toward the degree must be approved by the student's advisor. A thesis is required as part of the 30 credit hour graduation requirement.

Agricultural and Environmental Education (AGEE)

230. *Farm Structures*. II. 3 HR. Study of structures required for agriculture, family housing, storage, and recreation. Includes function, planning, layout, materials, construction techniques, prefabrication, repair, remodeling, and costs. 2 HR. rec., 3 HR. lab.

240. *Agricultural Engines*. I, II. 3 HR. Study of power sources (gasoline, diesel, turbine, wankel, etc.) for agriculture and forestry. Operating, selection, maintenance techniques, and emissions impact on power and fuel efficiency. 2 HR. rec., 3 HR. lab.

250. *Engineering Technology for Urban Watersheds and Irrigation*. 3 HR. Soil and water management; analysis of small watersheds and design of waterways, culverts, ponds, sediment basins, and turf irrigation systems. 3 HR. lec.

255. *Advanced Farm Machinery*. I. 3 HR. Systems approach to selection, use and operation of machinery related to agriculture, forestry and other rural activities. Emphasis on safety and environmental impact. Use of records for management decisions, purchase, replacement, sale, or overhaul. 2 HR. rec., 3 HR. lab.

260. *Principles of Cooperative Extension*. I. 2 HR. PR: Consent. History, philosophy, and mission of the cooperative extension service. Roles and functions of extension faculty in developing and presenting extension programs.

261. *Methods in Extension Education*. 2 HR. PR: Consent. Organization and preparation for extension teaching and the processes of communication.

262. *Agricultural and Natural Resource Communications*. I, II. 3 HR. Procedures and practices in developing, interpreting, and communicating agricultural and natural resource information; emphasis on visual materials and effective presentations. (3 HR. lec.)

263. *Adult Education in Agriculture and Natural Resources*. 2 HR. PR: Consent. Planning and preparation for teaching adult classes and advising agricultural organizations.

270. *Electricity and Lighting*. 3 HR. Properties of electricity and electrical circuits, residential wiring, selection of electric motors, use of electrical controls; and design of interior lighting, landscape lighting, and flood lighting systems. (Field trip required.)

280. *Agricultural Mechanics Problems*. 1-4 HR. PR: C or better in an AGEE course. Special projects and problems in theoretical analysis, design, or construction. 1-4 HR. conference.

290. *Waste Management-Composting*. 3 HR.

321. *Advanced Farm Mechanics*. 3 HR.

362. *Program Development and Evaluation in Extension*. II. 3 HR. PR: Consent. Planning, implementation, and evaluation of programs in rural and community development.

364. *Supervision of Agricultural Experience Programs*. S. 3 HR. PR: AGED 160 or consent. Planning supervision and evaluating experience programs of secondary students and adults.

460. *Planning Agricultural Programs and Courses*. S. 3 HR. PR: AGED 160 or consent. Formulating programs and courses for schools and communities.

491. *Advanced Study*. 1-6 HR.

496. *Graduate Seminar*. 1 HR.

497. *Research*. 1-15 HR.

Agricultural and Resource Economics

Peter V. Schaeffer, Director, Division of Resource Management

Gerard D' Souza, Graduate Program Coordinator

2018 Agricultural Sciences Building

Degree Offered: Master of Science

The master of science in agricultural and resource economics provides advanced training in the areas of environmental, natural resource, agricultural, mineral, energy, and rural development economics. The degree prepares students for further graduate study and a wide variety of careers in the private sector and government.

Admission Requirements

Prospective graduate students initiate application for admission on forms available from the University Office of Admissions and Records. The completed form should be returned to the Office of Admissions and Records, accompanied by payment of the nonrefundable application fee. An official transcript from all colleges attended during an applicant's undergraduate and graduate studies must be a part of the application for admission.

In addition to general requirements, students must have:

- Three letters of recommendation,
- Twelve or more semester credits in economics, agricultural and resource economics, statistics, or appropriate social science courses (should include intermediate microeconomics),
- Three or more semester hours of credit in calculus,
- A grade-point average of 2.75 for all credit in economics and agricultural and resource economics, and
- A letter of purpose describing research interests and professional aspirations is required.

Students seeking the degree of master of science in agricultural and resource economics may be accepted on a regular or provisional basis. The Admissions Committee reviews and evaluates all applications. Applicants who do not meet all of the requirements above but have special qualifications may be admitted on a provisional basis. Such admission will usually be subject to conditions, however, such as taking course work to make up for deficiencies. Such make-up work will not be counted as part of the credit requirements for the degree. Scores from the Graduate Record Examination are required from all applicants.

A student whose native language is not English must have obtained a minimum score of 550 on the TOEFL examination.

Thesis Option

Either a thesis or a course work option may be selected. Students should select the option by the time 12 hours of course work are completed (usually by the end of the first semester in the program) and after consulting with their graduate committees. Candidates with graduate research assistantships should select the thesis option.

Course Work Option

- A minimum of 30 credit hours of approved work to include not more than six hours of credit for the thesis, and enough courses to provide proficiency in economics, resource, and agricultural and resource economics. Courses in closely related areas may be included. The student's graduate committee must approve the student's course of study and thesis topic.

- A minimum of 36 credit hours of approved course work to provide proficiency in economics, resource, and agricultural and resource economics. Courses in closely related areas may be included if approved by the student's graduate committee.
- The student must satisfactorily complete a written and oral examination administered by the graduate committee.

Plan of Study

Each candidate's plan of study is developed by the student in consultation with his/her major professor and graduate committee. Normally, the plan of study will include graduate-level courses in economic theory, resource economics, environmental economics, statistics, and agricultural and resource economics. The plan of study should be developed during the first term of study.

GPA Requirement

A minimum grade-point average of 3.0 is required for all graduate credit courses. This includes graduate credit transferred and graduate credit accumulated while pursuing a degree in agricultural and resource economics. Persons requesting transfers of graduate credit must obtain approval of their graduate committee for such transfers.

Research Assistantships

A limited number of graduate research assistantships is available to highly qualified students on a competitive basis. The awards are based on academic merit only.

Agricultural and Resource Economics (ARE)

201. *Applied Demand Analysis*. II. 3 HR. Consumer demand economics applied to environmental, natural resource, and agricultural issues; analysis of factors that influence demand and determine prices; special applications to non-market, environmental, and natural resource amenities.

202. *Applied Production Economics*. I. 3 HR. Production economics applied to agricultural, environmental, and natural resource issues; production, multiple-product and cost functions, and joint production; effects of environmental and natural resource management regulations on the production process.

206. *Agribusiness Planning*. I. 3 HR. PR: ARE 104 or consent. Application of economic and management principles to agribusiness planning; consideration of risk and uncertainty in agribusiness planning; formulation of economic models for determining optimum allocation of resources for production processes.

210. *Environmental and Resource Economics*. I. 3 HR. PR: ARE 201 and 202; or ECON 211; or consent. Economic analysis of natural resource and environmental problems; management of renewable and nonrenewable resources and environmental amenities; market failure, externalities, benefit-cost and risk analysis; property rights and the "taking" issue.

211. *Rural Economic Development*. I. 3 HR. Economic trends, development policies, and analysis of rural economies in the United States. Rural diversity, development concepts, rural planning, public programs and policies, and community analysis methods.

220. *Agricultural Cooperatives*. I. 3 HR. History, principles, organization, management, taxation, and legal aspects of agricultural, marketing, supply and service cooperatives in the U.S. Development of non-agricultural cooperatives. (Offered in fall of odd years.)

231. *Marketing Agricultural Products*. II. 3 HR. Organization, functions, and analysis of the agricultural marketing system. Food consumption, exports, price analysis, marketing costs, market power, commodities futures market, food safety, and government regulations.

235. *Marketing Livestock Products*. I. 3 HR. Livestock marketing practices and policies. Supply and demand, livestock price cycles, grading, marketing alternatives, processing and retailing. Economic analysis of alternatives, current issues and trends. (Offered in fall of even years.)

240. *Futures Markets and Commodity Prices*. I. 3 HR. Analysis of price-making forces which operate in the market place; emphasis on major agricultural and mineral commodity and futures markets.

245. *Energy Economics*. II. 3 HR. Analysis of the energy sector and its relationship to the rest of the economy; energy security, deregulation, full cost pricing, substitutability among energy sources, transmission, new technologies, environmental considerations.

250. *Agricultural, Environmental and Resource Policy*. II. 3 HR. PR: ARE 201, 202; or ECON 211; or consent. Economic analysis of agricultural, natural resource and environmental policies; problems of externalities and market failure, and alternative policies for addressing such problems; benefits and costs of alternative policies.

261. *Agribusiness Finance*. II. 3 HR. An overview of financial analysis and the application of financial principles to small, rural and agricultural businesses. Includes applications of financial analysis computer software.

300. *Applied Microeconomics* I. 3 HR. PR: ECON 211 and 220 or equiv. Producer and consumer economics used in resource, environmental, and agricultural economic analysis.

321. *Quantitative Methods in Resource Economics*. I. 3 HR. PR: ECON 220 or equiv. Optimization techniques in economic analysis of natural resources; environmental and agricultural management problems; linear, nonlinear and dynamic programming.

324. *Econometric Methods in Resource Economics*. I. 3 HR. PR: ECON 226. Application methods to natural resource, environmental, and agricultural economic problems; single and simultaneous equation models, specification problems, topics in time series, and cross-sectional analysis.

329. *Resource Commodity Markets*. II. 3 HR. PR: ECON 325 and 326 or consent. Advanced econometric methods of specification, estimation and simulation of domestic and international resource markets and industries; time series and forecasting techniques.

330. *Production Economics*. II. 3 HR. PR: ARE 300 and ARE 321. Developments in producer economics applied to natural resource, environmental, and agricultural issues.

332. *Natural Resource and Environmental Economics*. II. 3 HR. PR: ARE 300 and 321 or equiv. Theory and institutions; market failure, externalities and property rights issues; renewable and nonrenewable resources, common property, environmental and resource management, and intergenerational decisions.

333. *Natural Resource Policy Analysis*. I. 3 HR. PR: ARE 300 and 321 or equiv. Welfare economics applied to the analysis and evaluation of natural resource, environmental, agricultural, and energy policy issues.

340. *Rural and Regional Development*. II. 3 HR. PR: ARE 300 and 321. Economic theories and quantitative techniques. Problems and goals for rural and regional planning; methods of policy analysis for community infrastructure development.

342. *International Agricultural Economic Development*. I. 3 HR. Current problems, theories, policies, and strategies in planning for agricultural and rural development for increased food production and to improve the well-being of rural people in the developing countries of the world.

343. *Project Analysis & Evaluation*. II. 3 HR. PR: Consent. Design, analysis, and evaluation of development projects; economic and financial aspects of project analysis; risk analysis; preparation of feasibility reports.

344. *International Markets and Trade*. I. 3 HR. PR: ARE 300 and 321. Causes and consequences of international trade and investment; commodity market structures, commodity price instability and international agreements; trade barriers and protection, export promotion, and impacts on developing countries.

365. *Mineral Finance*. II. 3 HR. Methods, risks, and problems of financing mineral projects. Large foreign-project financing, concerns of host governments, multinational mining concerns, and financial institutions.

380. *Energy Industry Economics*. II. 3 HR. PR: Graduate standing. Technical production and consumption methodologies, environmental concerns, and national and global economics and politics in making energy decisions.

381. *Resource Appraisal and Decision Making*. II. 3 HR. PR: ARE 300 or equiv. Investment analysis, decision making under risk and uncertainty, and project analysis applied to resource exploration and utilization; mineral and energy reserve and resource estimation techniques.

382. *Mineral Industry Economics*. II. 3 HR. Supply, demand, structure, technology, costs, prices, and problems of mineral industries.

400. *Research Methods*. II. 1 HR. Research methods in agricultural, environmental and resource economics. The application of scientific thinking in developing research proposals and critiquing published research.

403. *Advanced Natural Resource Economic Theory*. I. 3 HR. PR: ECON 310 and ARE 332. Allocation and distribution of natural resources in static and dynamic contexts; welfare economics, cost-benefit analysis, and optimal control approaches; applications to resource valuation, exhaustion, taxation, and regulation in theory and practice.

410. *Advanced Environmental Economics*. II. 3 HR. PR: ECON 310 and ARE 332 or consent. Theory, efficient environmental design and analysis, modeling of economic and environmental systems, evaluation of non-market benefits and costs, and risk assessment.

446. *Energy and Regional Development*. II. 3 HR. PR: ECON 355 and ARE 380. Energy in the West Virginia economy and selected regions of the United States.

483. *Minerals Technology Assessment*. II. 3 HR. PR: Consent. Methods of studying the effects of modifications in technology on the production of utilization of minerals, and the effects on mineral demand, supply, substitution, and markets.

484. *Oil and Gas Industry Economics*. II. 3 HR. PR: Consent. Geology, engineering, and economic theories of evaluating industry structures and performance.

485. *Economics of the Coal Industry*. Supply, demand, structure, production technology, costs, prices, and problems of the coal industry. Includes environmental, productivity, and transportation issues.

495. *Independent Study*. I, II. 1-4 HR. PR: Consent. Faculty-supervised study of topics not available through regular course offerings.

497. *Research*. 1-15 HR

Resource Management (RESM)

391. *Advanced Topics*. 1-6 HR.

397. *Research*. 1-15 HR.

490. *Teaching Practicum*. 1-3 HR.

491. *Advanced Study*. I, II, S. 1-6 HR. PR: Consent.

496. *Graduate Seminar*. I, II, S. 1 HR. PR: Consent.

497. *Research*. I, II, S. 1-15 HR.

Landscape Architecture (LARC)

229. *Landscape Architecture*. I. 3 HR. PR: For non-Landscape Architecture majors only. An appreciation of the basic principles of planting design and information pertaining to the use of ornamental plants around the home. 2 HR. lec., One 2-HR. studio.

248. *Design Analysis*. II. 2 HR. PR: Consent. Analysis of planning and design projects to offer solutions to a given problem. (Offered in spring of odd years.)

250. *Advanced Landscape Architectural Design 1. I.* 5 HR. PR: LARC 132 and LARC 151 and LARC 162. Comprehensive design problems integrating all aspects of site design, planting design and construction. Includes advanced projects for urban and rural sites. 2 HR. lec.; Two 3-HR. studios.

251. *Advanced Landscape Architectural Design 2. II.* 5 HR. PR: LARC 250. A comprehensive problem in Landscape Architecture in which the student demonstrates proficiency acquired from their program of study. 2 HR. lec., Two 3-HR. studios.

252. *Contemporary Issues in Landscape Architecture. II.* 2 HR. PR: LARC 250; Conc.: LARC 251. A series of seminar discussions exploring current and future trends in the practice of landscape architectural design, planning, and management. 2 HR. lec.

265. *Regional Design. II.* 3 HR. PR: Consent. Consideration of regional landscapes in order to effectively relate design to the ecology and development of a region. (Offered in spring of even years.)

284. *Professional Practice. I.* 3 HR. PR: Consent. Procedures in preparation of contract documents, fees, estimates, operation of an office, and relationship to clients and contractors. 3 HR. lec.

Agricultural Sciences

*Rosemary R. Haggett, Dean of the College of Agriculture, Forestry
and Consumer Sciences*

1170 Agricultural Sciences Building

Degree Offered: Doctor of Philosophy

The College of Agriculture, Forestry and Consumer Sciences offers graduate studies leading to the degree of doctor of philosophy in agricultural sciences. The doctoral program offers two majors: animal and food sciences, and plant and soil sciences. Students entering this program may select research and classes to emphasize environmental microbiology, agronomy, animal nutrition, entomology, horticulture, or plant pathology. The objective of the degree program is to provide doctoral students an opportunity to study and conduct research with faculty in areas of excellence within the College. Research and training in the various disciplines are under ten areas of emphasis in the college: agricultural biochemistry, animal nutrition, animal physiology, production management, crops agronomy, entomology, environmental microbiology, horticulture, plant pathology, and soil sciences.

Admission Requirements

Prospective students initiate application for admission on forms available from the WVU Office of Admissions and Records. The completed forms should be returned to the Office of Admissions and Records, accompanied by payment of the nonrefundable special service fee. An official transcript from all colleges attended in the course of an applicant's masters and undergraduate degrees must be part of the application for admission. Applicants must hold a master's or its equivalent to be eligible for admission into the program.

The following admission and performance standards are normally required in the doctor of philosophy in agriculture sciences program:

- An applicant must possess a master's degree and hold a grade-point average (GPA) of 3.0 or above (on a 4.0 scale) in postgraduate courses.
- The graduate record examination is required. For regular admission a minimum score of 1300 is expected.

- A student whose native language is not English must have obtained a minimum score of 550 on the TOEFL examination.
- An applicant must provide three letters of reference.
- A one to two page letter of intent from the student describing his/her research and professional aspirations is required.

Students who do not meet the requirements, but have special qualifications or circumstances, may be admitted as provisional graduate students if approved by the graduate faculty committee, division director, and doctoral program coordinator.

After a student is admitted into the doctoral program, the appropriate division director will appoint a major professor in the appropriate field of study. Doctoral students will conduct research in support of projects approved by the West Virginia Agriculture and Forestry Experiment Station (WVAFES) or externally funded grants. The major professor, in consultation with the student and the division director, will select a graduate committee within the first semester of study. The committee will consist of five or more members, the majority of whom must be WVU faculty, with at least one member representing a discipline outside the CAF & CS. Each student and his/her committee will formulate a plan of study, which will be filed in the office of the doctoral program coordinator. WVU regulations concerning committee membership will apply, namely, that the chairman and at least two committee members must be regular members of the CAF & CS graduate faculty.

Core Courses

Doctoral students must satisfactorily complete a set of core courses before they will be admitted to candidacy for the Ph.D. degree. All core courses will be at the 300- or 400-level, except where indicated below. Certain course requirements may be waived, if the student has received equivalent training in prior course work. Additional course work pertaining to the student's area of specialization will be determined by the student's major professor and graduate committee. Core courses for students in the doctoral program in Agricultural Sciences will be in the following areas.

- A minimum of six credit-hours of course work must be completed in the biological or earth sciences (excluding courses within a student's major field of study).
- A minimum of six credit-hours must be completed in biochemistry or advanced chemistry (200-level or above), depending on the student's research concentration.
- A two-semester sequence (minimum of six credits) must be completed in graduate level statistics, plus a course in experimental design OR a two-semester sequence (minimum of six credits) must be completed in graduate-level statistics plus one semester (minimum of three credits) of computer science beyond the introductory level.
- One seminar must be presented during each year or part of year in residence. A final dissertation research seminar will be presented as a college/university wide seminar.
- Oral and written comprehensive (qualifying) examinations will be administered by the student's graduate committee before the end of the second year following admission to the program. Satisfactory completion of the comprehensive examinations and core course requirements will admit the student to candidacy for the Ph.D.

Each candidate for the Ph.D. will be expected to meet the following general requirements:

- A minimum of three semesters in residence,
- Successful completion of course work requirements with a grade-point average of 3.0 or higher,
- Successful completion of comprehensive examinations prepared and evaluated by the student's graduate committee. Oral and written qualifying exams will be taken before the end of the second year following admission to the program,

- A dissertation, with the dissertation research applied toward an approved Experiment Station project or an approved independently funded research project, and
- Successful oral defense of the dissertation.

Although not required, presentation of research results at meetings of a professional society and submission of manuscripts for publication are encouraged.

Animal and Veterinary Sciences

John E. Warren, Director, Division of Animal and Veterinary Sciences

Hillar Klandorf, Graduate Program Coordinator

G038 Agricultural Sciences Building

Degree Offered: Master of Science

The master of science in animal and veterinary sciences in the College of Agriculture and Forestry allows maximum flexibility in courses and research problems. Students may emphasize physiology, production, nutrition or food sciences. They may work with beef and dairy cattle, sheep, swine, poultry, or laboratory animals. Research problems in farm animals form the basis for many studies, but a comparative approach is emphasized.

Prerequisites

Additional requirements are similar to those in other biological sciences. The student should have completed basic courses in the physical and biological sciences, including genetics, nutrition, and physiology. Deficiencies may prolong the time needed to complete degree programs.

A composite graduate record examination score of 1,000 or better will be considered as a basis of admission. The fact that an applicant meets the above requirements shall not guarantee admission since each professor will accept only the number of students that can be supervised adequately with available facilities, time, and funds. Students interested in the Ph.D. should apply for admission to the doctoral program in agricultural sciences or reproductive physiology.

Agricultural Biochemistry (AGBI)

210. *Introductory Biochemistry*. I, II. 3 HR. PR: 8 HR. General chemistry, CHEM 131 or equivalent. Introduction to chemistry of cellular constituents (proteins, amino acids, carbohydrates, lipids, nucleic acids, enzymes, and coenzymes) and their metabolism in animals and plants.

211. *Introductory Biochemistry Laboratory*. I. 1 HR. Conc.: AGBI 210. Experiments to demonstrate certain principles and properties of animal and plant biochemicals.

212. *Nutritional Biochemistry*. II. 3 HR. PR: AGBI 210 or consent. Nutritional biochemistry of domestic animals.

213. *Nutritional Biochemistry Laboratory*. II. 1 HR. PR: AGBI 210 and AGBI 211 and Conc.: AGBI 212. Experiments to determine the nutritional constituents in animal and plant tissues.

310. *General Biochemistry*. I. 4 HR. PR: 8 HR. organic chemistry. The first half of a general course of biochemistry designed for graduate students of biological sciences. The course emphasizes the chemical properties of cellular constituents.

311. *Laboratory Experiments in Biochemistry*. I. 2 HR. PR or Conc.: AGBI 310. Experiments designed to demonstrate some of the basic tools and procedures of biochemical research.

312. *General Biochemistry*. II. 4 HR. PR: AGBI 310 or consent. The second half of a general course of biochemistry designed for graduate students of biological sciences. The course emphasizes reactions and control of intermediary metabolism.

414. *Enzymes*. II. 3 HR. PR: AGBI 312 or consent. A survey of enzymology covering general principles as well as current concepts and methods.

415. *Advanced Biochemistry Laboratory*. II. 2 HR. PR or Conc.: AGBI 312. Experiments in the areas of intermediary metabolism and enzymology.

416. *Vitamin and Coenzyme Biochemistry*. II. 2 HR. PR: AGBI 312, or BIOL 231, or consent. Chemical and physical properties, analysis, biosynthesis, metabolism, pathobiology, pharmacology, and toxicology of vitamins, vitamin-like compounds, and coenzymes. (Offered in spring of odd years.)

422. *Plant Biochemistry*. I. 3 HR. PR: AGBI 312 or consent. Advanced treatment of the composition and metabolism of plants. Topics include cell wall structure, sulfur and nitrogen metabolism, and photosynthesis. (Offered in fall of odd years.)

424. *Advanced Nutritional Biochemistry*. I. 4 HR. PR: AGBI 310 and AGBI 311 and AGBI 312 or consent. Advanced treatment of the biochemistry and metabolism of amino acids, carbohydrates and lipids in the diets of ruminants and nonruminants. (Offered in fall of even years.)

428. *Biomembranes and Muscle Biochemistry*. II. 3 HR. PR: AGBI 312, or BIOC 231, or consent. Chemical, organization, and physiological aspects of membranes and muscles; molecular and cellular interactions and integrative mechanisms. 3 HR. lec. (Offered in spring of even years.)

Animal and Veterinary Science (A&VS)

201. *Values and Ethics*. 3 HR. PR: Senior standing or consent. Current ethical aspects in agriculture and forestry and their impact on societal values.

250. *Current Literature in Animal Science*. I. 3 HR. PR: ANNU 101. Evaluation of current research in animal science; its application to production and management. Note: Previously listed as ANPR 250.

420. *Special Topics*. I, II, S. 1-4 HR. (1 HR. credit in special cases only.) Advanced study in particular phases of such animal science topics as animal production, nutrition, physiology, breeding and genetics, veterinary science, and food. (For the master's degree, special topics ordinarily may count 2 to 4 HR.; max. credit, 6 HR.)

491. *Advanced Study*. I, II, S. 1-4 HR.

497. *Research*. I, II, S. 1-15 HR. Research in animal nutrition, physiology, breeding and production, and veterinary science.

499. Graduate Colloquium. 1-6 HR.

Animal Nutrition (ANNU)

301. *Principles of Nutrition and Metabolism*. I. 3 HR. PR: AGBI 210 or consent. A basic course in principles of nutrition with emphasis on the major classes of dietary nutrients and their digestion and utilization.

302. *Nutrition and Physiological Function*. II. 3 HR. PR: ANNU 301 or consent. Sequence to ANNU 301. Techniques used in nutritional studies and the relationship of nutrient requirements to physiological function in species of laboratory and domestic animals and man.

430. *Rumen Metabolism and Physiology*. I. 3 HR. PR: Course in biochemistry. The anatomy and physiology of the forestomachs of ruminants and the rumen microbial population. Emphasis on the microbial metabolism as it pertains to the utilization of feeds by ruminants. (Offered in fall of odd years.)

432. *Forage Chemistry and Quality*. 3 HR. PR: ANNU 301 and AGRN 254, or consent. Advanced course in chemistry and biochemistry of pastures and forages, emphasizing factors affecting their quality and principles governing their utilization by herbivorous animals. (Also listed as AGRN 432.) (Offered in spring of even years.)

434. *Mineral Nutrition of Animals*. II. 3 HR. PR: ANNU 301 or consent. Mineral nutrition of livestock and man; soil-plant-animal interactions. Detailed treatment of function of individual elements and their involvement in deficiency and toxicity conditions on an international basis. (Offered in spring of odd years.)

450. *Seminar*. I, II. 1 HR.

490. *Teaching Practicum*. 1-3 HR.

491. *Advanced Study*. I, II, S. 1-6 HR. (Repeat registration permitted for maximum of six credit hours per year.) Topics in advanced nutrition. Subject will be selected by staff for formal presentation.

Animal Physiology (ANPH)

200. *Growth and Lactation Physiology*. II. 3 HR. PR: ANPH 100, or consent. Animal life cycles; nature of growth and lactation; effects of biological, environmental, and social-psychological variants; physiological regulation and control.

204. *Animal Physiology Laboratory*. I. 2 HR. PR: ANPH 100 or consent. Laboratory study of the physiological systems of animals and the influences of environment on these systems. 4 HR. lab.

225. *Physiology of Reproduction*. II. 3 HR. PR: Course in biology. Comparative physiology of reproduction in higher animals; endocrine functions involved in reproduction; genetic and environmental variations in fertility mechanisms.

226. *Breeding of Farm Animals*. 3 HR. PR: Course in genetics or consent. Application of principles of quantitative genetics to the improvement of farm animals. (Offered in spring of odd years.)

280. *Behavioral Patterns of Animals*. 3 HR. Examination of the bases for exhibition and control of behavioral patterns of domesticated and nondomesticated species. 2 HR. lec., 3 HR. lab. (Offered in spring of even years.)

425. *Endocrinology of Reproduction*. II. 4 HR. (2 labs) PR: ANPH 225 or BIOL 268 or equivalent. Discussion of and laboratory experience in classical and current concepts of hormonal and neuro-hormonal regulations of reproductive phenomena with emphasis on species differences and similarities. (Offered in spring of odd years.)

426. *Advanced Animal Selection*. II. 3 HR. PR: Course in statistics and course in genetics or equivalent. An advanced course dealing with the basic concepts of experimental and statistical approaches in the analysis of quantitative inheritance with special reference to the magnitude and nature of genotypic and nongenotypic variability. (Offered in spring of even years.)

450. *Seminar*. I, II. 1 HR.

Animal Production (ANPR)

422. *Advanced Milk Production*. II. 3 HR. PR: ANNU 101 or consent. Advanced study of the feeding, breeding, and management of dairy cattle.

Food Science (FDSC)

267. *Advanced Meat Science*. 3 HR. PR: FDSC 167. Theoretical and experimental aspects of meat science, meat product/process systems, and the quantitative biology of muscle systems used for food. (Offered in spring of even years.)

Veterinary Science (VETS)

205. *Parasitology*. II. 3 HR. PR: Course in biology or consent. Common parasites of farm animals, their life cycles, effects on the host, diagnosis, control, and public health importance. 3 HR. lec., 1 HR. lab. (Offered in fall of even years.)

210. *Principles of Laboratory Animal Science*. 3 HR. PR: Consent for undergraduates. The production, genetics, physiology, nutrition, disease, and regulations of laboratory animals use in research and teaching. This course meets minimal requirements for laboratory animal technical certification programs of the American Association of Laboratory Animal Science (AALAS). (Offered in fall of even years.)

Family and Consumer Sciences

Janice I. Yeager, Director, Division of Family and Consumer Sciences

Wanda Franz, Graduate Program Coordinator

702 Allen Hall

Degree Offered: Master of Science

The graduate program in the Division of Family and Consumer Sciences provides students the opportunity to study for a master of science degree. Two areas of emphasis are offered: (1) child development/family studies; (2) human nutrition.

Students should have completed an undergraduate curriculum in the area of specialization for which they seek admission. A student whose undergraduate degree is in a different field will ordinarily be required to take supplemental undergraduate courses.

The child development/family studies emphasis is structured to give students a basis from which to conduct research and to work with families and children in educational and clinical settings. In addition, the program prepares students for entering Ph.D. programs in child development and family studies, family life education, psychology, or counseling.

Courses in child development and parenting strategies are supplemented with field experience in a variety of settings, such as the West Virginia University Child Development Laboratory, the Ruby Memorial Hospital neonatal intensive care and pediatric units, the W.G. Klingberg Center for Child Development, Stepping Stones, and parenting education programs in the community.

Individuals choosing an emphasis in child development and family studies may select from a wide variety of careers which include employment as child care specialists, early childhood teachers, developmental specialists, child life educators, parent educators, and extension specialists.

Human Nutrition

The human nutrition program offers students a variety of opportunities in clinical and applied nutrition. Admission as a regular graduate student requires that the student has had a basic nutrition course in the past five years and have completed organic chemistry. Students can apply to be enrolled concurrently in the developmentally accredited dietetic internship program, to become eligible to take the registration examination for the dietetics profession. The number of people who can be accepted into the internship program is limited. In addition, the program prepares students for entering doctoral programs in nutrition, education, and nutritional biochemistry.

A variety of research opportunities with the human nutrition and foods faculty is offered to students as collaborative opportunities are available with the WVU Health Sciences Center, the Gerontology Center, the exercise physiology program, and with the West Virginia child nutrition programs.

Background courses in nutrition, foods, general and organic chemistry, and the biological sciences are helpful to students selecting the human nutrition area for specialization. Graduates may select from a wide variety of careers, which include employment in hospitals, clinics, industrial and institutional food service organizations, fitness centers, and government-supported health programs.

Thesis or Research Report

Students pursuing a master of science degree in family and consumer sciences have a choice of two options: thesis or research report. The thesis option requires a minimum of 39 hours of course work, which includes six hours of research credit. The creative/scholarly problem option requires a minimum of 39 hours of course work, which includes three hours credit for a research project. For further information, contact the Graduate Program Coordinator, Division of Family and Consumer Sciences, 702 Allen Hall, P.O. Box 6124, West Virginia University, Morgantown, WV 26506-6124; (304) 293-3402.

Child Development and Family Studies (CDFS)

211. *Middle Childhood-Early Adolescent Development*. 3 HR. PR: CD&FS 10. Analysis and investigation of developmental factors in middle childhood-early adolescence. Consideration and diagnosis of physical, emotional, social, familial, moral, and intellectual interactions affecting the child, age 6-14. (Offered in fall of odd years.)

212. *Adolescent Development*. II. 3 HR. PR: CDFS 10. Adolescent in contemporary American culture, including normative physical, social, and personality development; relationships within various typical social settings. (e.g., family, school, community, peer group.)

213. *Contemporary Issues in Family Relations*. II. 3 HR. PR: Senior or graduate standing or consent. Study of recent research findings in the major areas of family relationships. Topics include effects of family violence, substance abuse, poverty, and health.

215. *Family Interaction and Communication*. II. 3 HR. PR: Senior or graduate standing or consent. The family as a social group; processes related to well-being for a variety of family relationships.

216. *Child Development Practicum*. I, II. 3-4 HR. Application of child development principles. Involves planning developmentally appropriate activities for 3, 4, and 5 year-old children at the West Virginia University Child Development Laboratory.

217. *Hospital Child Life Practicum*. I, II. 3 HR. PR: CDFS 112 and CDFS 194 and CDFS 216. Application of development principles to children in the hospital. Assignments involve learning intervention techniques to minimize hospital-generated stress and enhance normal development and family experiences.

340. *Survey of Family Studies*. I. 3 HR. A comprehensive overview of the theoretical and empirical literature focusing on the family. (Offered in fall of odd years.)

341. *Cognitive Development of the Child*. II. 3 HR. Piaget's basic theory, including his view of perceptual, symbolic, motor and logical-mathematical development, across the life span.

343. *Language Development in the Child*. I. 3 HR. Investigation of the origins and acquisitions of language in children with an emphasis on research and the theoretical issues that explain language as part of mens general cognitive functioning. (Offered in fall of even years.)

345. *Socio-Emotional Development of the Child*. I. 3 HR. A study and examination of contemporary theory and research into various facets of the socialization process in infancy and childhood. (Offered in fall of odd years.)

347. *Comparative Study of the Family*. I. 3 HR. The comparative method as a framework for family analysis. An examination of family diversity and multiculturalism in an ever-changing U.S. society. (Offered in fall of even years.)

348. *Theories of Child Development*. II. 3 HR. Examination of major theoretical conceptions of child development. Work of Werner, Piaget, Freud, Erikson, and the American learning theorists compared and contrasted. (Offered in fall of even years.)

349. *Seminar Family Therapy*. 3 HR.

Family Resources (FAMR)

281. *Issues in Consumer Sciences*. I, II. 3 HR. PR: Senior standing or consent. Examines the process of socialization for the professional role within the context of social change and current trends affecting families in the U.S. and overseas.

373. *Professional Development*. 1-6 HR.

390. *Research Methods in Family Resources*. II. 3 HR. PR: Introductory statistics or written consent. Research methodology, experimental design, and statistical analysis as relevant to problems in family resources.

391. *Advanced Topics*. I, II, S. 1-6 HR. PR: Consent.

394. *Practicum/Internship*. 1-6 HR.

396. *Graduate Seminar*. I, II, S. 1-4 HR. PR: Consent of graduate advisor.

397. *Research*. 1-15 HR.

490. *Teaching Practicum*. 1-3 HR.

Home Economics Education (HEED)

219. *Occupational Home Economics*. II. 3 HR. Prepares teachers to implement occupational home economics programs. Emphasis on organizing and administering programs, developing laboratory and work experiences, recruiting students, and evaluating progress.

278. *Vocational Home Economics*. II. 3 HR. PR: Senior standing. Develops an understanding of federal vocational legislation to enable an individual to develop and implement programs in vocational education.

Human Nutrition and Foods (HN&F)

260. *Advanced Nutrition*. I. 3 HR. PR: HN&F 71, physiology. Coreq.: Biochemistry. Role of nutrients in physiological and biochemical processes and metabolism in the body. Biochemical foundations of RDA and clinical nutrition.

261. *Nutrition Laboratory Experimentation*. I. 2 HR. Coreq.: HN&F 260 or consent. Nutrient analysis and introduction to nutrition experimentation; nutritional assessment.

272. *Community Nutrition*. I. (Even years). 3 HR. PR: HN&F 71. Beginning planning for community nutrition to individuals and families at various stages of the life cycle. Roles of concerned agencies and professional groups. Clinical experience in community facilities.

274. *Nutrition in Disease*. II. 4 HR. PR: HN&F 71; physiology or consent. Nutritional care aspects of patients. Modification of diet to meet human nutrition needs in various medical conditions.

370. *Human Nutrition Concepts and Application*. II. 3 HR. PR: HN&F 260 or equiv., and consent. Critical study of the nutrient evaluation methods and the nutrient requirements of the human in health and disease, and scope of its application. (Offered spring of even years.)

391. *Advanced Topics*. 1-6 HR.

397. *Research*. 1-15 HR.

Textiles and Clothing (TXCL)

222. *Fashion Merchandising*. I. 3 HR. PR: Senior standing. Study of merchandising activities performed on the retail level including planning sales and assortments, selecting merchandise for resale, controlling inventories, and determining profit. Basic mathematical formulas involved in merchandising are practiced.

224. *Flat Pattern Design*. II. 3 HR. PR: TXCL 27, and TXCL 124 and TXCL 126 or consent. Opportunity for creative expression and for understanding of pattern design through the flat pattern. Apparel designed and constructed by the student.

226. *Apparel Design and Illustration*. II. 3 HR. PR: TXCL 224 or consent. Techniques of drawing using a live fashion model and various media for apparel design presentation. Sources of design inspiration examined for developing original apparel designs. Art principles and fashion terminology explored.

227. *Textiles in the Global Economy*. I. (Even years). 3 HR. PR: TXCL 27. Explores economic, political and social dimensions of the international production and trade of textiles and apparel. Emphasis is on U.S. textile complex within an international perspective.

228. *Functional Apparel*. I. 3 HR. PR: ENGL 1 and ENGL 2, and TXCL 224. Physical, psychological, and sociological clothing needs of individuals with functional limitations. Historical developments, current research, and research needs. Each student conducts a community-based project.

229. *Merchandising Study Tour*. II. 1 HR. PR: Junior or Senior standing in Textiles, Apparel and Fashion Merchandising. Study of the textile, apparel and retail industries through on-site visits to historic costume collections, apparel manufacturing firms, design showrooms, buying offices, and retail establishments. Readings including.

Forestry

Joseph McNeel, Director, Division of Forestry

322-A Percival Hall

**Degrees Offered: Doctor of Philosophy in Forest Resource Science,
Master of Science in: Recreation and Parks Management, Wildlife and Fisheries
Management, Forestry.**

A student seeking admission to work toward the degree of doctor of philosophy in forest resources science in the College of Agriculture and Forestry may choose as the major field of study forest science, wood science, or wildlife and fisheries management. Within these major fields of study, specialization is limited only by the range of competencies in the graduate faculty.

Curriculum Requirements

Curriculum requirements for all candidates include a block of graduate courses in the major field, which will constitute a comprehensive review of the significant knowledge in that field, and a block of graduate courses in a minor field of study. A minimum of 60 semester hours beyond the bachelor's degree and exclusive of the dissertation is required.

Dissertation and Final Examination

The research work for the doctoral dissertation must show a high degree of scholarship and must present an original contribution to the field of forest resources science. In addition to course work and the dissertation, the candidate is required to pass a qualifying examination and a final examination.

Admission Requirements—Master's Degree Programs

Admission requirements are those of the College of Agriculture and Forestry. Additionally, students seeking admission for the degree of master of science in forestry (M.S.F.) should have completed an undergraduate curriculum in forestry. A student whose undergraduate degree is in a field other than forestry will ordinarily be required to take supplemental undergraduate courses. Candidates for the degree may major in forest biometry, forest ecology, forest economics, forest genetics, forest management, forest meteorology, silviculture, or wood industry. The candidate must complete 30 hours of approved study, six hours of which shall constitute a thesis. The program ordinarily requires two years of residence.

The Division of Forestry of the College of Agriculture, Forestry and Consumer Sciences offers program options leading to the master of science for students who wish to major in recreation and parks management. Students selecting this graduate program may emphasize recreation administration and policy, environmental education and interpretation, and recreation planning and resource management. Degree requirements are either 30 semester hours of approved study, including a six credit-hour thesis, or 36 semester hours without a thesis but including a three credit-hour problem paper. This program ordinarily requires two years of residence.

Graduate studies in wildlife and fisheries management in the Division of Forestry lead to the master of science (M.S.) degree. Students may elect either 30 semester hours of approved study, including a six hour thesis or 36 hours of approved study without a thesis but including a three hour problem paper.

Forestry (FOR)

220. *Forest Policy and Administration*. I and II. 3 HR. PR: Upperclass forestry major or consent. Forest policy in the United States; important federal and state laws; administration of public and private forests; problems in multiple-use forestry.

225. *Global Forest Resources*. II. 3 HR. Significance of renewable natural resources on a global scale and the ecological, economic, and social contexts in which they are managed. Emphasis is on world forest resources, including timber, wildlife, and social uses.

226. *Remote Sensing of Environment*. II. 2 HR. PR: MATH 3, and MATH 4. Measurement and interpretation of natural resources and environment from photography, radar, infrared, and micro-wave imagery.

310. *Biometeorology*. II. 4 HR. PR: Consent. A description of the physical environment of plants and its effect on growth, its modification for increasing yield and for plant protection against extreme atmospheric conditions.

470. *Special Topics in Forestry, Wood Science, Wildlife or Recreation*. I, II, S. 1-6 HR.

480. *Principles of Research*. I. 2 HR. The specific method as applied in the formal, concrete, and normative sciences; special emphasis on forestry-related research plans and reports.

490. *Teaching Practicum*. I, II. 1-6 HR. PR: Consent. Supervised practices in college teaching of forest resources management, wood science, wildlife management resources, and recreation and parks.

491. *Advanced Study*. I, II, S. 1-6 HR. PR: Consent. Investigation in advanced subjects which are not covered in regularly scheduled classes.

497. *Research*. I, II, S. 1-15 HR.

498. *Thesis*. I, II, S. 2-4 HR. PR: Consent.

499. *Graduate Colloquium*. I, II, S. 1-6 HR. PR: Consent. For graduate students not seeking course work credit but who wish to meet resident requirements, use the University's facilities, and participate in its academic and cultural programs.

Forest Hydrology (FHYD)

244. *Watershed Management*. II. 3 HR. PR: FMAN 12, and FMAN 211. (Primarily for forest management majors.) Influences of silvicultural practices and forest management activities on the hydrology of forested catchments.

Forest Management (FMAN)

200. *Forest Resources Management Field Practice*. S. 5 HR. PR: FOR 5, and CE 5, and FMAN 122. (Course will be taught during four consecutive 6-day weeks.) Application and study of forest management practices with emphasis on field problems.

201. *Forest Resources Management Field Trip*. S. 1 HR. PR: FMAN 200 or consent. One-week trip to observe forest managements practices on private and public lands outside the Appalachian hardwoods region.

211. *Silvicultural Systems*. I. 4 HR. PR: FOR 5, and FMAN 12, and FMAN 122, or FOR 5 and WMAN 213. The theory and practice of controlling forest stand establishment, composition, structure, and growth. Systems include: reproduction methods, release operations, and intermediate treatments.

213. *Regional Silviculture*. I. 2 HR. PR: Forestry major or consent, FMAN 12; PR or Conc.: FMAN 211. Major forest types of the United State: their composition, management, problems, and silvicultural treatment.

216. *Forest Genetics and Tree Improvement*. II. 3 HR. PR: Forestry major or consent; GEN 272, or equiv., or consent. Forest genetic principles and their application to forest tree improvement, including crossing methods, selection systems, and other techniques.

222. *Advanced Forest Mensuration*. II. 3 HR. PR: Forestry major or consent; FMAN 122. Measurement of growth and yield; statistical methods applied to forest measurement problems.

230. *Principles of Forestry Economics*. II. 4 HR. PR: ECON 54 or ARE 50 and ECON 55. Production, distribution and use of forest goods and services. Emphasis on analytical methods and problem solving techniques in the economic aspects of forestry.

233. *Forest Management*. I. 3 HR. PR: FMAN 200, and FMAN 211, and FMAN 230. Principles of sustained yield forest management: organization of forest areas, selection of management objectives, application of silvicultural systems, and regulation of cut. Principles of sustainable forestry and ecosystem management.

234. *Forest Resources Management Planning*. II. 3 HR. PR: Senior standing in the Division of Forestry. Integrated planning of long-term management of forest resources. Development of a management plan for an actual forest tract. Emphasis on biological, social, economic and ethical considerations in decision-making.

330. *Advanced Principles of Forestry Economics*. II. 3 HR. PR: ECON 54 or ARE 50 and ECON 55 and FMAN 230. Intensive study of both micro-and macroeconomics of forestry.

340. *Current Issues in Forest Management*. I. 3 HR. PR: Consent. Analysis of environmental issues in forest management and current controversies surrounding the management of forested lands. Emphasis on traditional and ecosystem-based forest management policy, philosophy, and practices. (Offered in fall of odd years.)

411. *Advanced Forest Ecology*. I. 3 HR. PR: FMAN 12 or equivalent; FMAN 211. Ecological relationships in forests with emphasis on biogeochemical cycles.

412. *Silvicultural Practices for Hardwood Forest Types II*. 3 HR. PR: FMAN 211. Designing proper silvicultural systems for managing Appalachian hardwood stands; reconstructing stand histories, recognizing problems, and prescribing appropriate silvicultural treatment.

Recreation & Parks Management (RCPK)

216. *Philosophy of Recreation*. II. 3 HR. PR: Consent. Interpretation of recreation as a basic part of the living process; importance to individual community and national welfare; social and economic significance.

233. *Wildland Recreation Management*. I. 3 HR. PR: FMAN 12 or consent. Topics include an analysis of administrative agencies concerned with wildland management; methods of ameliorating human impact on outdoor recreation resources; discussion of philosophies underlying wilderness recreation; and a review of contemporary controversies concerning wildlands.

234. *Wilderness in American Society*. II. 3 HR. PR: RCPK 233 or consent. A seminar examining political, sociological, and environmental aspects of American wilderness. A discussion on articles concerning wilderness preservation, management, and aesthetics.

235. *Parks and Recreation Administration*. I. 3 HR. PR: 12 HR. of recreation and parks courses, junior standing, or consent. Principles of administration as applied to the operation of recreation and park agencies, including legal foundations, policy, organization, personnel, finance, and programs of service.

239. *Natural Resource Tourism*. I. 3 HR. PR: Junior standing. Tourism in natural settings; emphasis on sustainable tourism development and natural resource stewardship. (Field trip required; some transportation costs.)

242. *Historical and Cultural Interpretation*. II. 3 HR. PR: Recreation and parks major or consent. Methods of locating source materials for reconstructing the historical, cultural, and physical aspects of an area for an interpretive center; preparing brochures, displays, and nature trails to facilitate interpretive activities.

333. *Natural Resources Recreation Management*. I. 3 HR. PR: Consent. Study of governmental and private sector organizations involved in the delivery of natural resource-based recreational opportunities: examination of management systems; review of current issues and controversies. (Some travel costs may be incurred.)

338. *Tourism Planning*. I. 3 HR. Use of natural settings; integration of tourism development with respect to environmental protection concerns. (Field trip required; some transportation and food costs.)

391. *Advanced Topics*. 1-6 HR.

397. *Research*. 1-15 HR.

408. *Recreation and Park Management Practicum*. 2-4 HR. PR: Consent. Field experience and conference in the study, analysis, and solution of management problems in private, commercial and governmental recreation and park organizations.

415. *Leisure and Recreation*. I. 3 HR. PR: Consent. Study of leisure as a social phenomenon and its implications for recreation.

421. *Recreation Planning: Human Interest Areas*. 3 HR. Exploration of human interest areas as sources of recreation program content; the nature, factors, and extent of participation; and their structuring and administration through work program planning. (Offered in fall of even years.)

472. *Seminar in Recreation*. I, II. 1-3 HR. (Repeatable up to 6 HR. credit.) Overview and critical analysis of literature in recreation interpretation, environmental concerns, or leisure studies.

Wildlife and Fisheries Management (WMAN)

213. *Wildlife Ecosystem Ecology*. I. 3 HR. PR: BIOL 15 and BIOL 17, and FOR 5 or consent. Basic principles of ecosystem ecology, emphasizing structure and function, succession, adaptation of organisms to the environment (physiological ecology), and survey of major ecosystems with emphasis on their roles as wildlife habitats.

214. *Wildlife Population Ecology*. II. 3 HR. PR: WMAN 213 or consent. Emphasis on theoretical and applied population ecology including population growth, interactions, regulation, and effects of harvesting and exploitation on natural populations. 2 HR. lec., 1 HR. lab.

221. *Interpretive Bird Study*. II. 3 HR. PR: BIOL 17 or consent. Intensive field studies in recognition through sight, song, and behavioral patterns of birds, and their ecology in the Central Appalachians. 2 HR. lec., 2 HR. lab.

224. *Vertebrate Natural History*. I. 3 HR. PR: BIOL 17 or consent. Relationships of fish, amphibians, and reptiles to the forest, with emphasis on the ecology, taxonomy, evolution, natural history, and field identification of these groups. Laboratory emphasizes natural history and anatomy of fish, amphibians, and reptiles.

225. *Mammalogy*. II. 3 HR. PR: BIOL 17 or consent. Mammals and their biological properties with emphasis on life history, ecology, and distribution of regional forms. (Also listed as BIOL 258.)

226. *Ornithology*. II. 3 HR. PR: BIOL 15 and 17, or consent. Identification, distribution, and ecology of birds (particularly of forest lands.) (2 HR. lec., 1 HR. lab.)

228. *Wildlife Policy and Administration*. II. 3 HR. Study of the organization, authority, policies, programs, and administration of public agencies and private organizations concerned with fish and wildlife. Emphasis is in the legal and political role in making wildlife management decisions.

231. *Wildlife Habitat Techniques*. I. 3 HR. PR: Wildlife major or consent; WMAN 213, FOR 5. Field and laboratory techniques necessary in management and study of wildlife; collection of field data, mapping, censusing, habitat evaluation, wetland delineation, use of literature and scientific writing.

234. *Principles of Wildlife Animal Damage Control*. II. 3 HR. PR: Wildlife major or consent; WMAN 213, 231. Basic principles of controlling wildlife damage to agricultural crops, forest resources, human lives, and human property. Includes methods of identifying damage caused by various wildlife species.

240. *Principles of Wildlife Toxicology*. I. (Alternate years). 3 HR. PR: WMAN 213, CHEM 16. Survey of toxicological environmental contamination. Ancillary topics include oil, metals, pesticide impacts; legislative mandates; vertebrate sampling procedures and risk assessment.

245. *Introduction to Fisheries Management*. II. 3 HR. PR: WMAN 224 or consent. Basic principles of management of fishery resources, with an emphasis on freshwater stocks. Includes current environmental and management issues, concepts, and methods used in management of commercial and recreational fisheries.

250. *Pollution and Management of Aquatic Ecosystems*. II. 3 HR. PR: Junior standing. Biological and ecological effects of water pollution and loss of freshwater resources. Topics include effects of effluents, water diversion, and land use practices on aquatic resources in lake, river, and wetland environments, mitigation and management techniques, and regulatory structures.

280. *Wildlife/Fisheries Field Tech*. I, S. 3 HR. PR: Jr or Sr standing. Survey of methods and techniques frequently used in the field by wildlife and fisheries managers. Class is taught off-campus.

312. *Advanced Wildlife Population Ecology*. II. 3 HR. PR: WMAN 214 or equivalent, or consent. Case history approach to wildlife population ecology with emphasis on ungulates, gallinaceous birds, large predators; forest invertebrates and their vertebrate predators; endangered species; genetics and conservation of wildlife populations. Emphasis on current and historical literature. (3 HR. lec.)

333. *Quantitative Ecology*. I. 3 HR. PR: STAT 311 or equivalent, and WMAN 213 or equivalent. A survey of techniques and strategies for the quantitative analysis of complex ecological data sets. (Offered in fall of odd years.)

370. *Wildlife Seminar*. II. 1 HR. per semester; (4 HR. max.) PR: Consent. Discussion of current developments in wildlife management.

380. *Rural and Urban Wildlife Management*. II. 3 HR. PR: Consent. Management of nongame wildlife in the rural and urban environment, emphasizing habitat improvement and development and control of pest species. 2 HR. lec., 1 HR. lab. (Offered in spring of odd years.)

434. *Ecology and Management of Upland Wildlife*. I. 4 HR. PR: Consent. Ecology and management of upland game birds and mammals with emphasis on recent literature. (Offered in fall of even years.)

436. *Ecology and Management of Wetland Wildlife*. II. 4 HR. PR: Consent. Ecology and management of waterfowl and wetland furbears with emphasis on recent research and management literature. (Offered in spring of even years.)

Wood Science (WDSC)

200. *Forest Measurement Field Practice*. S. 3 HR. PR: Wood Industry major, FOR 5, CE 1, FMAN 122. Application of surveying and mensurational practices with emphasis on field problems.

201. *Wood Industries Field Trip*. S. 1 HR. A one-week trip to observe manufacturing methods and techniques of commercial wood industry plants. Plants visited include furniture, plywood, veneer, hardboard, pulp and paper, sawmilling, and preservation.

213. *Wood Chemistry*. I. 3 HR. PR: Wood Industry major or consent, and CHEM 131 or CHEM 133. Chemical composition of wood including cellulose, hemicellulose, and extractives. Chemical processing of wood.

222. *Harvesting Forest Products*. 3 HR. PR: MATH 4 or equivalent and WDSC 132. Analysis of ground-based and cable harvesting systems, including time and motion studies, productivity and cost analysis, occupational safety and health, environmental issues, equipment evaluation and selection, and trucking of forest products. (2 HR. lec., 1 HR. lab.)

223. *Forest Roads*. 4 HR. PR: CE 5, CS 5. Techniques of design, layout, and construction details of various standards of forest roads. (2 HR. lec., 2 HR. lab.)

230. *Wood Machining*. I. 2 HR. PR: Consent. Introduction to basic concepts of wood machining with emphasis on production equipment and furniture manufacturing.

234. *Statistical Quality Control*. I. 3 HR. PR: Forestry major or consent. Methods used to control quality of manufactured wood products. Control charts of variables and attributes. Acceptance sampling techniques.

235. *Light-Frame Wood Construction*. I. 2 HR. PR: Forestry major or consent. Use of wood in light-frame construction. Basic design procedures and construction methods.

237. *Wood Adhesion and Finishing*. II. 3 HR. PR: Wood Industry major or consent; WDSC 123 and WDSC 141. Fundamentals of the bonding and finishing of wood including preparation, processing, and evaluation of adhesive and finishing systems.

240. *Physical Behavior of Wood*. II. 3 HR. PR: WDSC 123, and PHYS 1, and MATH 4. Specific gravity and density of wood; relationships between wood and liquids and applications in wood seasoning; thermal, electrical, and acoustical properties.

241. *Wood Mechanics*. 3 HR. PR: Wood industry major or consent; WDSC 123, and MATH 15, and PHYS 1. Introduction to static properties of selections, elementary mechanics of deformable bodies, axial loading, column and beam analysis, and design considerations. (2 HR. lec., 1 HR. lab.)

251. *Forest Products Protection*. II. 3 HR. PR: WDSC 123. Biological organisms responsible for deterioration of wood products, their control by preservative methods, and study of fire retarding methods.

260. *Plant Layout for Wood Industries*. II. 3 HR. PR: Senior standing. Relates knowledge of wood product processes to optimize production. Study of proper arrangement of machines, and work and storage areas.

262. *Forest Products Decision-Making*. I. 3 HR. PR: Junior standing in Forestry. Decision-making tools and techniques used by the forest products industry such as simulation-linear programming, network analysis, forecasting, game theory.

265. *Wood-based Composite Materials*. 3 HR. PR: WDSC 132, and WDSC 240, and WDSC 241. Fundamentals of manufacturing wood-based composite materials, including processing, products, evaluation, and applications in the marketplace. (2 HR. lec., 1 HR. lab.)

320. *Wood Microstructure*. I. 3 HR. PR: WDSC 123; senior standing. Detailed examination of wood microstructure as it relates to processing, behavior, and identification.

340. *Advanced Physical Behavior of Wood*. I. 3 HR. PR: WDSC 240 or equivalent or consent. Physical relationships of water and wood; fluid flow through wood; thermal, electrical, and acoustical behavior of wood. Theories of wood drying and their application.

362. *Forest Products Operations Research Models*. II. 3 HR. PR: WDSC 262 and demonstrated knowledge of Fortran and Basic, or consent. Analysis of operations research models currently used by the forest products industry. Students will develop new models. (Offered in spring of even years.)

473. *Seminar in Wood Utilization*. II. 1-4 HR. per semester; max. credit, 4 HR. PR: Consent. Reports and discussions of recent research in fundamental and applied phases of wood utilization.

Genetics and Developmental Biology

Joginder Nath, Chairperson of the Interdisciplinary Faculty
1120 Agricultural Sciences Building

Degrees Offered: Master of Science, Doctor of Philosophy

Areas of Emphasis

The Master of Science and Doctor of Philosophy degrees are offered in genetics and developmental biology, an interdisciplinary program involving the faculty and facilities of a number of departments in the various colleges and schools of the University. A student may concentrate in genetics or developmental biology. The areas in which emphases are offered are as follows:

Genetics—Biochemical and molecular genetics, cytogenetics, developmental genetics, immunogenetics, mutagenesis, toxicology, human genetics, plant genetics, population and quantitative genetics, and animal breeding;

Developmental Biology—Molecular aspects of development, experimental morphogenesis, teratology, regeneration, oncology, descriptive embryology, and life cycles of animals and plants.

The student may also minor in one or more other scientific fields.

Requirements

Students are expected to maintain at least a 3.0 (B) average in all work offered in fulfillment of the degree program. For a more complete statement of requirements, the student is referred to the program's Guidelines for Graduate Students in the Genetics and Developmental Biology Program.

Program Objective

The objective of this program is an increased level of understanding of modern concepts and methodologies employed in genetic and developmental biological work and to prepare a student to pursue a career in teaching and/or research. Responsibility for a student's program is vested in a graduate committee charged with arranging the student's course work, conducting examinations, and supervising the research.

Admission

To be considered for admission in the program the student must possess a baccalaureate degree from an accredited college or university, must have a grade-point average of at least a 2.75 (on a 4.0 scale), or an average of 3.0 or higher for the last 60 credit hours or an average of 3.0 or higher in all courses in sciences and mathematics.

GRE and New MCAT

The student must submit the scores of the Graduate Record Examination (GRE), or the New Medical College Admission Test (New MCAT). The student must provide three letters of reference from persons acquainted with the applicants' professional work, experiences, or academic work, and submit a written statement of 500 words or more indicating the applicants' goals and objectives relative to receiving a graduate degree.

Basic training in mathematics, physics, chemistry, and biology is required for admission. Students lacking prerequisites may be accepted in a provisional status but must fulfill them before graduation. Applications for graduate study should be sent in as early

in the year as possible, but not later than April 1 for entry the following August. However, applications are accepted year-round for admission to the program in the following semester. Official transcripts of baccalaureate and/or master's degrees must be sent directly to the WVU Office of Admissions and Records. Application forms can be received from the WVU Office of Admissions and Records, P.O. Box 6009, Morgantown, WV 26506-6009. For further information, write to the chair.

Developmental Biology

The following courses in the Departments of Anatomy, Biochemistry, and Biology may be applied toward the requirements for a major in developmental biology: Anatomy 402 *Advanced Developmental Anatomy*, 405 *Experimental Embryology*, Biochemistry 491 *Advanced Study in Nucleic Acids*, Biology 214 *Molecular Basis of Cellular Growth*, Biology 309 *Molecular Biology of the Gene*, Biology 362 *Developmental Biology*, and Biology 364 *Advanced Plant Physiology*.

Genetics (GEN)

290. *Crop Breeding*. II. 3 HR. PR: GEN 171 or GEN 321. Methods and basic scientific principles involved in improvement of leading crops through hybridization, selection, and other techniques. (Offered in spring of even years.)

321. *Basic Concepts of Modern Genetics*. I. 3 HR. PR: 8 HR. Biological sciences and 1 year chemistry. Independent inheritance, linkage. Chemical nature of genetic material. Control of phenotype by genetic material. Gene action and coding of genetic material.

325. *Human Genetics*. II. 3 HR. PR: GEN 171 or GEN 321 or consent. Study of genetic system responsible for development of phenotype in man. (Offered in spring of odd years.)

335. *Population Genetics*. II. 3 HR. PR: GEN 171 or GEN 321 or consent. Relationship of gene and genotype frequencies in populations of diploid organisms, and the effects of mutation, selection, assortive mating, and inbreeding in relation to single gene pairs. Application of these concepts to multigenic inheritance of quantitative traits. (Offered in fall of odd years.)

370. *Medical Genetics*. II. 2-4 HR. PR: Second-year medical student standing; graduate student in Genetics and Developmental Biology; others by consent. Introduction to clinical genetics including molecular, biochemical, and cytogenetic aspects of human biology. Application of genetic principles to human health and disease. (Also listed as CCMD 370, MED 370, PEDI 370.)

391. *Advanced Topics*. I, II, S. Variable 1-6 HR. PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

424. *Cytogenetics*. II. 4 HR. PR: GEN 171 or GEN 321, and BIOL 215 or consent. Emphasis on macromolecules that carry information of the chromosomes, cell division, and the cytological and molecular basis of genetics. Special attention given to visible manifestation of genes, human cytogenetics, of genomes and chromosome morphology, and their evolution. (Offered in spring of odd years.)

426. *Advanced Biochemical Genetics*. II. 3 HR. PR: GEN 171 or GEN 321 and organic chemistry. Physiological and biophysical concepts of genetic material. Structure and arrangement of genetic units. Nucleic acids as carriers of genetic information. Gene action and amino acid coding. Biochemical evolution of genetic material. Genetic control mechanisms of mutation. (Offered in fall of even years.)

427. *Genetic Mechanisms of Evolution*. I. 3 HR. PR: GEN 171 or equivalent. Molecular genetic mechanisms which result in evolutionary change. Origin of life, origin and organization of genetic variability, differentiation of populations, isolation and speciation, role of hybridization and polyploidy, and origin of man. (Offered in fall of odd years.)

450. *Seminar*. I, II. 1 HR. per semester. Recent literature pertaining to biochemical, classical, human, molecular, and cytological genetics.

497. *Research*. I, II, S. 1-15 HR.

Natural Resource Economics

Peter V. Schaeffer, Director, Division of Resource Management

Gerard D' Souza, Graduate Program Coordinator

2018 Agricultural Sciences Building

Degree Offered: Doctor of Philosophy

The Agricultural and Resource Economics Program in the Division of Resource Management offers graduate studies leading to the degree of doctor of philosophy in natural resource economics. The doctoral program offers three fields of study:

- Natural resource and environmental economics,
- Commodity market analysis modeling and forecasting, and
- International development.

Careers for which students completing the program are qualified include those with universities, research institutes, industry, and state, national, or international agencies concerned with natural resource and environmental issues.

Admission

Prospective graduate students initiate application for admission on forms available from the University Office of Admissions and Records. The completed form should be returned to the Office of Admissions and Records, accompanied by payment of the nonrefundable application fee. An official transcript from all colleges attended during an applicant's undergraduate and graduate studies must be a part of the application for admission.

Performance Standards

- An applicant must possess a master's degree and hold a grade-point average of 3.5 or above (on a 4.0 scale) in postgraduate courses.
- Scores from the Graduate Record Examination are required. A combined score of 1600 (verbal, quantitative, and analytical scores) or better is expected from applicants to the Ph.D. program.
- Applicants whose native language is not English must have obtained a minimum score of 550 on the TOEFL examination.
- Three letters of recommendation are required.
- A letter of purpose describing research interests and professional aspirations is required.

Applicants who do not meet all of the requirements above but have special qualifications may be admitted if approved by the Graduate Admission Committee, the Division Director, and the Graduate Program Coordinator. Such admission will usually be subject to conditions, however, such as taking course work to make up for deficiencies. Such make-up work will not be counted as part of credit requirements for the degree.

A limited number of graduate research assistantships are available to highly qualified students on a competitive basis. The awards are based on academic merit only.

Requirements for Research

After a student is admitted, the program coordinator will appoint a major professor to direct his/her research. Doctoral students will conduct research in support of approved projects. The student, in consultation with the major professor, will select a graduate committee during the second semester of study. The committee will consist of five or more members, the majority of whom must be WVU faculty, with at least one member representing a discipline outside the program. Each student and his/her committee will formulate a plan of study, which will be filed in the office of the program coordinator. University regulations concerning committee members require that a majority of the graduate committee, including the major professor, must be regular members of the WVU graduate faculty.

Core Courses

Doctoral students must satisfactorily complete a set of core courses in economic theory, quantitative methods, and resource analysis before they will be admitted to candidacy for the Ph.D. degree. All core courses will be at the 300- or 400-level. Certain course requirements may be waived if the student has received equivalent training in prior course work. Additional required course work pertaining to the student's area of specialization will be determined by the student's major professor and graduate committee.

Fields of Study

There are three fields of study: natural resource and environmental economics; commodity analysis, modeling, and forecasting; and international development. Doctoral students must select two fields subject to approval by the student's major professor and graduate committee. The student will be required to successfully complete a minimum of three courses at the 300- or 400-level in each field selected.

Admission to Candidacy

Oral and written qualifying examinations will be administered by the qualifying examination committee before the end of the second year following admission to the program. Upon satisfactory completion of the qualifying examinations and core course requirements, the student will be eligible for admittance to candidacy for the Ph.D. in natural resource economics.

Completion

Each candidate for the Ph.D. degree will be expected to meet the following general requirements:

- A minimum of two years in residence,
- Successful completion of qualifying examinations and examinations in two fields of study,
- A dissertation, and
- Successful oral defense of the dissertation.

Although not a requirement, presentation of research results at a meeting of a professional society and submission of manuscripts for publication are encouraged.

Agricultural and Resource Economics (ARE)

201. *Applied Demand Analysis*. II. 3 HR. Consumer demand economics applied to environmental, natural resource, and agricultural issues; analysis of factors that influence demand and determine prices; special applications to non-market, environmental, and natural resource amenities.

202. *Applied Production Economics*. I. 3 HR. Production economics applied to agricultural, environmental, and natural resource issues; production, multiple-product and cost functions, and joint production; effects of environmental and natural resource management regulations on the production process.

206. *Agribusiness Planning*. I. 3 HR. PR: ARE 104 or consent. Application of economic and management principles to agribusiness planning; consideration of risk and uncertainty in agribusiness planning; formulation of economic models for determining optimum allocation of resources for production processes.

210. *Environmental and Resource Economics*. I. 3 HR. PR: ARE 201 and 202; or ECON 211; or consent. Economic analysis of natural resource and environmental problems; management of renewable and nonrenewable resources and environmental amenities; market failure, externalities, benefit-cost and risk analysis; property rights and the "taking" issue.

211. *Rural Economic Development*. I. 3 HR. Economic trends, development policies, and analysis of rural economies in the United States. Rural diversity, development concepts, rural planning, public programs and policies, and community analysis methods.

220. *Agricultural Cooperatives*. I. 3 HR. History, principles, organization, management, taxation, and legal aspects of agricultural, marketing, supply and service cooperatives in the U.S. Development of non-agricultural cooperatives. (Offered in fall of odd years.)

231. *Marketing Agricultural Products*. II. 3 HR. Organization, functions, and analysis of the agricultural marketing system. Food consumption, exports, price analysis, marketing costs, market power, commodities futures market, food safety, and government regulations.

235. *Marketing Livestock Products*. I. 3 HR. Livestock marketing practices and policies. Supply and demand, livestock price cycles, grading, marketing alternatives, processing and retailing. Economic analysis of alternatives, current issues and trends. (Offered in fall of even years.)

240. *Futures Markets and Commodity Prices*. I. 3 HR. Analysis of price-making forces which operate in the market place; emphasis on major agricultural and mineral commodity and futures markets.

245. *Energy Economics*. II. 3 HR. Analysis of the energy sector and its relationship to the rest of the economy; energy security, deregulation, full cost pricing, substitutability among energy sources, transmission, new technologies, environmental considerations.

250. *Agricultural, Environmental and Resource Policy*. II. 3 HR. PR: ARE 201, 202; or ECON 211; or consent. Economic analysis of agricultural, natural resource and environmental policies; problems of externalities and market failure, and alternative policies for addressing such problems; benefits and costs of alternative policies.

261. *Agribusiness Finance*. II. 3 HR. An overview of financial analysis and the application of financial principles to small, rural and agricultural businesses. Includes applications of financial analysis computer software.

300. *Applied Microeconomics* I. 3 HR. PR: ECON 211 and 220 or equiv. Producer and consumer economics used in resource, environmental, and agricultural economic analysis.

321. *Quantitative Methods in Resource Economics*. I. 3 HR. PR: ECON 220 or equiv. Optimization techniques in economic analysis of natural resources; environmental and agricultural management problems; linear, nonlinear and dynamic programming.

324. *Econometric Methods in Resource Economics*. I. 3 HR. PR: ECON 226. Application methods to natural resource, environmental, and agricultural economic problems; single and simultaneous equation models, specification problems, topics in time series, and cross-sectional analysis.

329. *Resource Commodity Markets*. II. 3 HR. PR: ECON 325 and 326 or consent. Advanced econometric methods of specification, estimation and simulation of domestic and international resource markets and industries; time series and forecasting techniques.

330. *Production Economics*. II. 3 HR. PR: ARE 300 and ARE 321. Developments in producer economics applied to natural resource, environmental, and agricultural issues.

332. *Natural Resource and Environmental Economics*. II. 3 HR. PR: ARE 300 and 321 or equiv. Theory and institutions; market failure, externalities and property rights issues; renewable and nonrenewable resources, common property, environmental and resource management, and intergenerational decisions.

333. *Natural Resource Policy Analysis*. I. 3 HR. PR: ARE 300 and 321 or equiv. Welfare economics applied to the analysis and evaluation of natural resource, environmental, agricultural, and energy policy issues.

340. *Rural and Regional Development*. II. 3 HR. PR: ARE 300 and 321. Economic theories and quantitative techniques. Problems and goals for rural and regional planning; methods of policy analysis for community infrastructure development.

342. *International Agricultural Economic Development*. I. 3 HR. Current problems, theories, policies, and strategies in planning for agricultural and rural development for increased food production and to improve the well-being of rural people in the developing countries of the world.

343. *Project Analysis & Evaluation*. II. 3 HR. PR: Consent. Design, analysis, and evaluation of development projects; economic and financial aspects of project analysis; risk analysis; preparation of feasibility reports.

344. *International Markets and Trade*. I. 3 HR. PR: ARE 300 and 321. Causes and consequences of international trade and investment; commodity market structures, commodity price instability and international agreements; trade barriers and protection, export promotion, and impacts on developing countries.

365. *Mineral Finance*. II. 3 HR. Methods, risks, and problems of financing mineral projects. Large foreign-project financing, concerns of host governments, multinational mining concerns, and financial institutions.

380. *Energy Industry Economics*. II. 3 HR. PR: Graduate standing. Technical production and consumption methodologies, environmental concerns, and national and global economics and politics in making energy decisions.

381. *Resource Appraisal and Decision Making*. II. 3 HR. PR: ARE 300 or equiv. Investment analysis, decision making under risk and uncertainty, and project analysis applied to resource exploration and utilization; mineral and energy reserve and resource estimation techniques.

382. *Mineral Industry Economics*. II. 3 HR. Supply, demand, structure, technology, costs, prices, and problems of mineral industries.

400. *Research Methods*. II. 1 HR. Research methods in agricultural, environmental and resource economics. The application of scientific thinking in developing research proposals and critiquing published research.

403. *Advanced Natural Resource Economic Theory*. I. 3 HR. PR: ECON 310 and ARE 332. Allocation and distribution of natural resources in static and dynamic contexts; welfare economics, cost-benefit analysis, and optimal control approaches; applications to resource valuation, exhaustion, taxation, and regulation in theory and practice.

410. *Advanced Environmental Economics*. II. 3 HR. PR: ECON 310 and ARE 332 or consent. Theory, efficient environmental design and analysis, modeling of economic and environmental systems, evaluation of non-market benefits and costs, and risk assessment.

446. *Energy and Regional Development*. II. 3 HR. PR: ECON 355 and ARE 380. Energy in the West Virginia economy and selected regions of the United States.

483. *Minerals Technology Assessment*. II. 3 HR. PR: Consent. Methods of studying the effects of modifications in technology on the production of utilization of minerals, and the effects on mineral demand, supply, substitution and markets.

484. *Oil and Gas Industry Economics*. II. 3 HR. PR: Consent. Geology, engineering, and economic theories of evaluating industry structures and performance.

485. *Economics of the Coal Industry*. Supply, demand, structure, production technology, costs, prices, and problems of the coal industry. Includes environmental, productivity, and transportation issues.

495. *Independent Study*. I, II. 1-4 HR. PR: Consent. Faculty-supervised study of topics not available through regular course offerings.

Resource Management (RESM)

491. *Advanced Study*. I, II, S. 1-6 HR. PR: Consent.

496. *Graduate Seminar*. I, II, S. 1 HR. PR: Consent.

497. *Research*. I, II, S. 1-15 HR.

Plant and Soil Sciences

Barton S. Baker, Director, Division of Plant and Soil Sciences and Graduate Program Coordinator

1090 Agricultural Sciences Building

Degree Offered: Master of Science

Areas of Emphasis

The Master of Science degree in Plant and Soil Sciences is offered to students who wish to study crops agronomy, entomology, environmental microbiology, horticulture, plant pathology, or soil science.

Program Objective

The objective of the M.S. in Plant and Soil Sciences is to provide students the opportunity to take courses and conduct original, master-level research in their areas of specialization. The educational experience obtained through courses and research is expected to provide students with the background and expertise to enter doctoral programs or professional careers as agronomists, entomologists, microbiologists, horticulturists, and plant pathologists. These disciplines are critical to maintain agriculture and forest productivity, solve environmental problems and promote economic development in the state.

Admission and Performance Standards

In order for a student to be admitted to the program, the following admission criteria will be considered. The applicant normally must:

- Possess a baccalaureate degree,
- Have a minimum undergraduate grade point average of 2.75 (3.0 for acceptance as a regular graduate student.),
- Have an adequate academic aptitude at the graduate level as measured by the Graduate Record Examination (GRE) or other tests/evidence,
- Provide three letters of reference from persons acquainted with the applicant's professional work, experience, or academic background, and
- Submit a written statement of approximately 500 words indicating the applicant's goals and objectives relative to receiving a graduate degree.

International students have the additional requirement to submit a minimum score of 550 on the TOEFL examination if their native language is not English. Interviews are encouraged but not required.

Students enrolled in the M.S. in Plant and Soil Sciences must complete STAT 311, 312, ENGL 208 (technical writing), or other comparable course, and three semesters of seminar in their area of emphasis. Other class requirements will be determined by the student's graduate committee and made a part of the student's plan of study. This degree requires a minimum of 30 graduate credit hours, six of which may be research.

Each student must develop a plan of study, conduct original research and prepare a thesis. The plan of study which is to be developed within the first year of study must contain the courses to be taken plus an outline of the research to be conducted. The thesis must be satisfactorily defended in an oral examination given by the student's graduate committee.

Agronomy (AGRN)

210. *Soil Fertility*. I. 3 HR. PR: AGRN 10. Soil properties in relation to fertility and productivity of soils; scrutiny of essential plant nutrients; use of fertilizers and lime; evaluation of soil fertility.

212. *Soil Conservation and Management*. I. 3 HR. PR: AGRN 10. Using soil technology to solve soil management problems relating to cropping systems. Field diagnosis of soil problems stressed. 2 lec., 2 lab.

215. *Soil Survey and Land Use*. I. 3 HR. PR: AGRN 15 or consent. Identification of morphological characteristics and taxonomic units of soil; techniques of writing soil pedon and mapping unit descriptions; techniques of preparing soil maps; evaluation of soil for land use planning. (2 HR. lec., 3 HR. lab.) (Offered fall of odd years.)

217. *Soil Genesis and Classification*. I. 4 HR. PR: AGRN 15 or consent. Origin and formation of soils; principles of soil classification; study of soil pedons and polypedons; influence of soil-forming factors and processes. Two Saturday field trips required. (3 HR. lec., 3 hr lab.) (Offered fall of even years.)

220. *Soil Microbiology*. I. 3 HR. PR: ENVM 141. Microbiology and biochemistry of the soil environment. Occurrence, distribution, ecology, and detection of micro-organisms in soil. (Offered in fall of even years. Also listed as ENVM 220 and ENVP 220.)

225. *Environmental Soil Management*. I. 3 HR. PR: AGRN 102 and AGRN 103. This course provides a foundation for utilizing creative solutions and technical knowledge in preserving and enhancing soil and water quality. Soil conservation, precision agriculture and nutrient management for protection of soil and water quality are covered. (Equivalent to ENVP 225)

230. *Soil Physics*. II. 3 HR. PR: AGRN 10. Physical properties of soils; water and air relationships and their influence on soil productivity. (Offered in spring of even years.)

251. *Weed Control*. I. 3 HR. PR: PLSC 52 or consent. Fundamental principles of weed control. Recommended control measures for and identification of common weeds. 2 lec., 1 lab. (Offered in fall of odd years.) (Also listed as ENVP 251.)

252. *Grain and Special Crops*. II. 3 HR. PR: PLSC 52 or consent. Advanced study of methods in the production of grain and special crops. Varieties, improvement, tillage, harvesting, storage, and use of crops grown for seed or special purposes. (Offered in spring of even years.)

254. *Forage Crops*. I. 3 HR. PR: PLSC 52, AGRN 102 and AGRN 103, or consent. All phases of forage crop science, including ecology, taxonomy, management practices used for the production of forage and seed, and forage composition, quality, and utilization.

255. *Reclamation of Disturbed Soils*. II. 3 HR. PR: Junior standing or above. Principles of soil science, geology, hydrology, and engineering will be applied to surface mine planning, overburden handling during mining, soil replacement and amendments, revegetation practices, acid mine drainage control and treatment, hazardous wastes, and land management of disturbed areas. (Field trip required.) (Also listed as ENVP 255.)

325. *Forage Harvesting and Storage*. 3 HR. PR: AGRN 254, or consent. Advanced study of processes associated with harvesting and storage of forages. 3 HR. lec. (Offered in fall of odd years.)

352. *Pedology*. II. 3 HR. PR: AGRN 217 or consent. Genesis and evolution of soils considered as natural bodies; including both macro-and micromorphological properties. Saturday field trips required. 2 HR. lec., 1 HR. lab. (Offered in spring of odd years.)

354. *Pasture Management and Utilization*. 3 HR. PR: AGRN 254 and ANNU 101, or consent. Advanced study of pastures and their management and utilization with emphasis on temperate species. 3 HR. lec. (Offered in spring of odd years.)

374. *Tropical Grasslands*. 3 HR. PR: AGRN 254 and ANNU 101, or consent. Advanced study of tropical grasslands and their management and utilization in animal production. (Offered in fall of even years.)

410. *Soil Testing and Plant Analysis*. II. 3 HR. PR: AGRN 210 and BIOL 169, or consent. Influence of soil chemical and physical properties on availability of plant nutrients; intensive study of individual plant nutrients and interactions of nutrients in soils and crops; and intensive study of methods used to test soils and analyze plants for nutrients and other metals. 2 lec. and 1 lab. (Offered in spring of even years.)

416. *Soil Chemistry*. I. 3 HR. PR: Consent. Chemistry of soil development; chemical and mineralogical composition of soils; nature and properties of organic and inorganic soil colloids; cation and anion exchange phenomena; soil chemistry of macro and micro-nutrients. (Offered in fall of odd years.)

418. *Chemistry of Soil Organic Matter*. II. 3 HR. PR: Organic chemistry or consent. Chemical composition of soil organic matter studied in relation to its physico-chemical properties and humus formation. Methods involving extraction, fractionation, and purification of soil organic components examined. 2 lec., 1 lab. (Offered in spring of odd years.)

421. *Identification of Clay Minerals in Soil*. II. 3 Hr PR: Physical chemistry or consent. Characterization of clay minerals is an important aspect in soils, geology, civil engineering, and related fields. Study of methods used in qualitative and quantitative identification of these secondary minerals in soils and rocks. 1 lec., 2 lab. (Offered in spring of even years.)

432. *Forage Chemistry and Quality*. 3 HR. PR: ANNU 301 and AGRN 254, or consent. Advanced course in chemistry and biochemistry of pastures and forages, emphasizing factors affecting their quality and principles governing their utilization by herbivorous animals. (Also listed as ANNU 432.) (Offered in spring of even years.) (3 HR. lec.)

Entomology (ENTO)

201. *Apiculture*. II. 3 HR. PR: BIOL 1 and BIOL 3 and BIOL 2 and BIOL 4 or consent. Developmental, physiology, and behavior of the honey bee with emphasis on colony management, pollination of crops, diseases of bees, properties of honey and beeswax, and marketing of honey bee products.

202. *Apiculture Laboratory*. II. 1 HR. PR or Conc: ENTO 201. Identification and anatomy of honey bees, assembly and use of beekeeping equipment, field management of honey bees, examination for diseases and pests, production of queens and numlei. (1 HR. lab.)

204. *Principles of Entomology*. I. 4 HR. PR: BIOL 1 and BIOL 3 and BIOL 2 and BIOL 4 or equiv. Basic course dealing with the anatomy, morphology, physiology, reproduction, systematics, ecology, and management of insects.

210. *Insects Pests in the Agroecosystem*. I. 3 HR. PR: ENTO 204 or consent. Life cycle, damage, and economic impact of pestiferous insects in the agroecosystem. Included are insect pests of agricultural and ornamental plants, stored products, structures, and livestock. 2 lec., 1 lab.

212. *Pest Management*. II. 3 HR. PR: ENTO 204 or consent. An in-depth look at current problems and solutions in controlling insect pests in an environmentally compatible manner. Management techniques include cultural, mechanical, physical, biological, regulatory, and chemical practices. 3 HR. lec. (Also listed as ENVP 212.)

390. *Special Topics in Entomology*. 2-6 HR.

Environmental Microbiology (ENVM)

201. *Environmental Microbiology*. II. 4 HR. PR: ENVM 141 or consent. Microbiology as applied to soil, water, wastewater, sewage, air, and the general environment. Occurrence, distribution, ecology, and detection of microorganisms in these environments. (Also listed as ENVP 201.)

220. *Soil Microbiology*. I. 3 HR. PR: ENVM 141. Microbiology and biochemistry of the soil environment. Occurrence, distribution, ecology, and detection of microorganisms in soil. (Offered in fall of even years. Also listed as AGRN 220 and ENVP 220.)

347. *Food Microbiology*. 4 HR.

348. *Sanitary Microbiology*. II. 3 HR. PR: ENVM 141 or consent. Microbiology and health hazards associated with food handling, water treatment, and sanitary waste disposal. (Offered in spring of even years.)

350. *Current Concepts in Microbial Ecology*. I, II. 1 HR. Emphasis on reading, criticism, and discussion of recent journal articles from the primary literature in microbial ecology/environmental microbiology.

Environmental Protection (ENVP)

200. *Environmental Impact Assessment*. I. 3 HR. PR: BIOL 1 and BIOL 2 and BIOL 3 and BIOL 4 and CHEM 15 and CHEM 16. Application of physical, biological and social science principles to assess environmental impacts. Review and prepare environmental assessments, permits, site assessments, and ecological risk assessments for environmental decision-making.

201. *Environmental Microbiology*. II. 4 HR. PR: ENVM 141 or consent. Microbiology as applied to soil, water, wastewater, sewage, air, and the general environment. Occurrence, distribution, ecology, detection of microorganisms in these environments. (Also listed as ENVM 201.)

212. *Pest Management*. II. 3 HR. PR: ENTO 204 or consent. An in-depth look at current problems and solution in controlling insect pests in an environmentally compatible manner. Management techniques include cultural, mechanical, physical, biological, regulatory, and chemical practices. 3 lec. (Also listed as ENTO 212.)

220. *Soil Microbiology*. I. 3 HR. PR: ENVM 141. Microbiology and biochemistry of the soil environment. Occurrence, distribution, ecology, and detection of micro organisms in soil. (Offered in fall of even years. Also listed as ENVM 220 and AGRN 220.)

225. *Environmental Soil Management*. I. 3 HR. PR: AGRN 102 and AGRN 103. This course provides a foundation for utilizing creative solutions and technical knowledge in preserving and enhancing soil and water quality. Soil conservation, precision agriculture and nutrient management for protection of soil and water quality are covered. (Equivalent to AGRN 225.)

251. *Weed Control*. I. 3 HR. PR: PLSC 52 or consent. Fundamental principles of weed control. Recommended control measures for and identification of common weeds. 2 HR. lec, 1 HR. lab. (Offered in fall of odd years.) (Also listed as AGRN 251.)

255. *Reclamation of Disturbed Soils*. 3 HR. PR: Junior standing or above. Principles of soil science, geology, hydrology, and engineering will be applied to surface mine planning, overburden handling during mining, soil replacement and amendments, revegetation practices, acid mine drainage control and treatment, hazardous wastes, and land management of disturbed areas. (Field trip required.) (Also listed as AGRN 255.)

Horticulture (HORT)

204. *Plant Propagation*. II. 3 HR. PR: PLSC 52 or consent. Study of practices of plant propagation and factors involved in reproduction in plants.

242. *Small Fruits*. I. 3 HR. PR: PLSC 52, HORT 107, or Consent. (One 2-day field trip required.) Taxonomic, physiological, and ecological principles involved in production and handling of small-fruits. 2 lec., 1 scheduled lab. (Offered in fall of odd years.)

243. *Vegetable Crops*. I. 3 HR. PR: PLSC 52 or consent. (One 3-day field trip required.) Botanical and ecological characteristics influencing the production of vegetable crops. 2 HR. lec., 1 HR. lab. (Offered in fall of even years.)

244. *Handling and Storage of Horticultural Crops*. I. 3 HR. PR: PLSC 52 and CHEM 16. Characteristics of perishable crops. Methods and materials used to maintain quality. 2 lec., 1 lab. (Offered in fall of odd years.)

245. *Greenhouse Management*. II. 3 HR. PR: Two semesters of Inorganic Chemistry and HORT 107 or consent. Greenhouse as a controlled plant environment. How to regulate factors influencing plant growth and development within specialized environments of greenhouses.

246. *Tree Fruits*. I. 3 HR. PR: PLSC 52 or consent. Principles and practices involved in production of tree fruits. 2 lec., 1 scheduled lab. (Offered in fall of even years.)

301. *Post Harvest Physiology*. 3 HR.

Plant Pathology (PPTH)

201. *General Plant Pathology*. I. 4 HR. Nature and causes of plant diseases; methods of control.

301. *Disease of Economic Plants*. I, II, S. 1-3 HR.; 2 HR. in summer. PR: PPT 201 or 303 or consent. Recognition, cause, and control of diseases of economic plants. (Sem. I—Diseases of vegetable crops and of tree and small fruits; Sem. II—Diseases of ornamental plants and field and forage crops; S—Disease of forest trees. Students may register for 1-3 hrs. in I and II, 2 HR. in S, until 8 hours of credit are accumulated) (Offered in alternate years.)

302. *Principals of Plant Pathology*. II. 4 HR. PR: PPTH 153, 201, or 303, or consent. (Primarily for graduate students and seniors majoring in biology or agriculture science.) Nature of disease in plants with practice in laboratory methods. (Offered in spring of even years.)

303. *Mycology*. I. 4 HR. Lectures and field and laboratory studies of parasitic and saprophytic fungi. (Offered in fall of even years.)

309. *Nematology*. II. 3 HR. (Primarily for graduate students majoring in the agricultural sciences or biology.) Nematode taxonomy, bionomics, and control, with particular emphasis on plant parasitic forms. (Offered in spring of odd years.)

313. *Insect Transmit Plant Diseases*. 3 HR.

402. *Physiology Plant Diseases*. I. 3 HR. PR: AGBI 310 and PPTH 302, or consent. Study of host-parasite interactions, with emphasis on physiological and biochemical changes that occur in higher plant tissue in response to pathogenic organisms.

430. *Physiology of Fungi*. II. 4 HR. PR: Organic chemistry, mycology, and bacteriology, or consent. Physiological aspects of growth, reproduction, and parasitism of fungi, with emphasis on nutrition, environment, and other biotic factors. (Offered spring of odd years.)

440. *Taxonomy of the Fungi*. S. 3 HR. PR: PPTH 303. Collection and identification of fungi with emphasis upon those of economic importance. (Offered in summer of even years.)

Plant Science (PLSC)

420. *Special Topics*. I, II, S. 1-6 HR. Special study in environmental microbiology, crop science, horticulture, plant pathology, or soil science.

450. *Seminar*. I, II. 1 HR. Graduate seminar in environmental microbiology, crop science, horticulture, plant pathology, or soil science.

497. *Research*. I, II, S. 1-15 HR. Graduate research in environmental microbiology, crop science, horticulture, plant pathology, or soil science.

Reproductive Physiology

E. Keith Inskeep, Chairperson of the Interdisciplinary Faculty

G-044 Agricultural Science Building

Degrees Offered: Master of Science: Doctor of Philosophy

Requirements

The graduate program in reproductive physiology, leading to master's and doctoral degrees, is interdisciplinary, with faculty located in the Departments of Animal and Veterinary Sciences, Biology, Obstetrics and Gynecology, Pharmacology and Toxicology, Physiology, and Plant and Soil Sciences. Requirements for admission include at least a 2.75 grade-point average (4.0 system) and completion on the following prerequisites with a grade of C or better in each: calculus, genetics, organic chemistry, physics, and vertebrate embryology. It is recommended, but not required, that applicants complete both the aptitude and the advanced tests of the Graduate Record Examination. Foreign languages are not required for a degree in reproductive physiology. Only a limited number of students are accepted each year.

Research

Research topics include function and regression of the corpus luteum, aging of the oocyte, control of postpartum reproductive performance, environmental factors in reproduction, control of steroidogenesis, control of estrus and ovulation, new methods of artificial insemination, ovarian follicular development, endocrine functions of polypeptides, neuroendocrine control of gonadotropic hormone secretion and roles of prostaglandins in reproduction.

Research is almost entirely with farm animals, including poultry.

Courses

The program draws on courses offered in various departments and includes courses in endocrinology, advanced reproductive physiology, biochemistry, physiology, statistics, and developmental embryology.

Eberly College of Arts and Sciences

M. Duane Nellis, Ph.D., Dean

Joan S. Gorham, Ph.D., Associate Dean

Rudolph P. Almasy, Ph.D., Associate Dean

Nicholas G. Evans, Ed.D., Associate Dean

Fred L. King, Ph.D., Associate Dean

Asuntina S. Levelle, J.D., Assistant Dean

The Eberly College of Arts and Sciences is West Virginia University's largest college, with 325 faculty in academic departments and program areas in literature and the humanities, social and behavioral sciences, and mathematics and natural sciences. The college supports 15 graduate programs, ten of which include doctoral programs; its departments occupy 12 buildings on the downtown campus. Many of the faculty enjoy distinguished national and international reputations and have been honored for excellence in teaching, research, and service. Their awards not only acknowledge extreme dedication but also accentuate the relationship between the faculty and the students. Graduate students often collaborate with faculty on specialized research projects which lead to publications in national and international journals. In 1995, the faculty of the college produced over 300 publications, delivered 315 professional presentations, and received 112 grants and contracts, 50 professional association citations, and 49 academic honors. In recent years, Arts and Sciences faculty have generated over \$6,000,000 annually in external support for research and instruction.

The Eberly College of Arts and Sciences offers doctoral programs in biology, chemistry, English, geography, geology, history, mathematics, physics, political science, and psychology. Available research or teaching concentrations are as follows:

- Biology—cellular and molecular biology, environmental plant biology.
- Chemistry—analytical, inorganic, organic, physical, and theoretical chemistry.
- English—literature.
- Geography—regional development, geographic information systems.
- Geology—energy (basin analysis), environmental geology.
- History—United States (Appalachia), Europe, Africa, science, and technology.
- Mathematics—selected areas of pure, applied, and discrete mathematics.
- Physics—condensed matter, applied physics, plasma physics, astrophysics, electro-optics, and elementary particle physics.
- Political science—public policy analysis (domestic and international).
- Psychology—behavior analysis, developmental psychology, and clinical psychology.

Graduate programs leading to a master's degree are available in biology, chemistry, communication studies, English, foreign languages, geography, geology, history, liberal arts, mathematics, physics, psychology, public administration, sociology and anthropology, and statistics. Each program prepares students for further study or for productive roles in professional environments. Information concerning graduate programs in the Eberly College of Arts and Sciences may be obtained by contacting Associate Dean for Research and Graduate Studies, Eberly College of Arts and Sciences, 201 Woodburn Hall, West Virginia University, P.O. Box 6286, Morgantown, WV 26505-6286; telephone (304) 293-4611.

Graduate Programs

Biology	M.S.	Ph.D.
Chemistry	M.S.	Ph.D.
Communication Studies	M.A.	
English	M.A.	Ph.D.
Foreign Languages	M.A.	
Geography	M.A.	Ph.D.
Geology	M.S.	Ph.D.
History	M.A.	Ph.D.
Mathematics	M.S.	Ph.D.
Physics	M.S.	Ph.D.
Political Science	M.A.	Ph.D.
Psychology	M.A.	Ph.D.
Public Administration	M.P.A.	
Sociology and Anthropology	M.A.	
Statistics	M.S.	

Graduate Faculty

† Indicates regular member of graduate faculty.

* Indicates associate member of graduate faculty.

Biology

Professors

Edward C. Keller, Jr., Ph.D. (Penn. St. U.). Ecology, Genetics.

†Gerald E. Lang, Ph.D. (Rutgers U.). Provost. Plant ecology, Biogeochemistry, Wetland ecology.

†James B. McGraw, Ph.D. (Duke U.). Plant ecology, Plant population biology.

*Richard P. Sutter, Ph.D. (Tufts U.). Cellular/molecular biology, developmental biology, molecular genetics.

Associate Professors

†Dorothy C. Dunning, Ph.D. (Tufts U.). Bat prey defenses and other aspects of bat biology.

†Philip E. Keeting, Ph.D. (U. Med. Dent. Sch.). Molecular endocrinology.

† Ramsey Frist, Ph.D. (U. Pitt.). Biophysics.

†Keith Garbutt, Ph.D. (U. Wales). Chairperson. Population genetics, Plant ecology.

Assistant Professors

Ashok Bidwai, Ph.D. (Utah State). Molecular and biochemical analysis of protein kinases.

†Clifford P. Bishop, Ph.D. (U. Va.). Developmental and molecular biology of *Drosophila*.

†Jonathan R. Cumming, Ph.D. (Cornell U.). Plant physiology, Rhizosphere ecology.

†Jorge A. Flores, Ph.D. (George Wash. U.). Endocrinology of reproduction, signal transduction.

†William T. Peterjohn, Ph.D. (Duke U.). Biogeochemistry, Ecosystem ecology.

†Jeffrey L. Price, Ph.D. (Johns Hopkins U.). *Drosophila* genetics, Circadian rhythms.

†Richard B. Thomas, Ph.D. (Clemson U.). Physiological plant ecology, Global environmental change.

†Ray Thweatt, Ph.D. (U. of Texas Health Sci. Center). Cellular senescence, Molecular biology of aging.

Clinical Assistant Professor

Donna Ford-Werntz, Ph.D. (Missouri). Plant systematics.

Chemistry

Professors

†Robert S. Nakon, Ph.D. (Tex. A&M U.). Bioinorganic chemistry, Chelates, Catalysis.

†Jeffrey L. Petersen, Ph.D. (U. Wisc.). Physical inorganic chemistry, Organometallic chemistry, X-ray diffraction, Catalysis, Olefin polymerization.

†Reuben H. Simoyi, Ph.D. (Brandeis U.). Physical chemistry, Chemical kinetics, Oscillating reactions.

†Kenneth Showalter, Ph.D. (U. Colo.). C. Eugene Bennett Chair of Chemistry, Chemical kinetics, Multistability and oscillating systems.

†Kung K. Wang, Ph.D. (Purdue U.). Organic chemistry, Stereoselective synthesis, Natural products.

Associate Professors

†Harry O. Finklea, Ph.D. (Calif. Inst. Tech.). Analytical/physical chemistry, Properties of organized monolayers deposited on electrodes.

†Charles Jaffe, Ph.D. (U. Col.). Theoretical chemistry, Molecular dynamics, Nonlinear mechanics.

†Paul W. Jagodzinski, Ph.D. (Tex. A&M U.). Chairperson. Physical chemistry, Raman spectroscopy, Molecular spectroscopy.

†Fred L. King, Ph.D. (U. Va.). Analytical chemistry, Mass spectrometry, Gas-phase ion chemistry.

†John H. Penn, Ph.D. (U. Wisc.). Organic chemistry, Photochemistry, Electron transfer.

†Ronald B. Smart, Ph.D. (U. Mich.). Associate Chairperson. Environmental analytical chemistry, Electrochemistry, Trace metals.

†Alan M. Stolzenberg, Ph.D. (Stanford U.). Inorganic chemistry, Bioinorganic chemistry, Organometallic chemistry.

Assistant Professors

†Kay M. Brummond, Ph.D. (Penn State U.). Synthetic organic chemistry, synthetic methods, natural products synthesis.

†Katharine J. Covert, Ph.D. (Cornell U.). Inorganic and organometallic chemistry; Synthesis, kinetics, and reaction mechanisms.

Terry Gullion, Ph.D. (William and Mary). Physical Chemistry, Solid State NMR, Structural Elucidation.

Debra L. Mohler, Ph.D. (U. Cal-Berkeley). Organic chemistry, Bioorganic and bioorganometallic chemistry, Nanostructures.

Vincent T. Remcho, Ph.D. (Va. Tech.). Analytical chemistry, Chemical separations, Chromatography, electrophoresis.

Bjorn C. Sodenberg, Ph.D. (Royal Inst. of Tech.-Stockholm). Organic and organometallic chemistry, Synthetic methods, Natural product synthesis.

Communication Studies

Professors

†Melanie Booth-Butterfield, Ph.D. (U. Mo.). Interpersonal communication, Nonverbal communication, Communication in health.

†Joan S. Gorham, Ed.D. (Northern Ill. U.). Interim Associate Dean. Communication in instruction, Nonverbal communication, Mass communication.

†James C. McCroskey, Ed.D. (Penn. St. U.). Chairperson. Communication avoidance, Communication in instruction, Interpersonal and organizational communication.

†Virginia P. Richmond, Ph.D. (U. Nebr.). Interpersonal and organizational communication, Nonverbal communication, Communication in instruction.

Associate Professors

†Steven Booth-Butterfield, Ed.D. (WVU). Mass communication, Interpersonal communication, Communication in instruction, Persuasion, Health communication.

Assistant Professors

†Robert A. Barraclough, Ed.D. (WVU). Communication in instruction, Intercultural communication, Interpersonal communication, Organizational communication.

*Stephen C. Hines, Ph.D. (Purdue U.). Interpersonal communication, Persuasion, Research methods.

†Matthew M. Martin, Ph.D. (Kent St. U.). Argumentation, Personality differences, Interpersonal and family communication.

†Brian Patterson, Ph.D. (U. Okla.). Interpersonal communication, Nonverbal communication, Health communication.

English

Professors

†Timothy D. Adams, Ph.D. (Emory U.). American autobiography, American literature, American studies.

†Dennis Allen, Ph.D. (U. Minn.). Critical theory, Prose fiction, Popular culture.

†Patrick W. Conner, Ph.D. (U. Md.). Chairperson. Eberly College Centennial Professor in English. Anglo-Saxon literature and culture, Medieval English literature, Humanities computing.

- †Richard B. Eaton, Jr., Ph.D. (U. N.C.). 19th-and 20th-century American literature, Eugene O'Neill.
- †William W. French, Ph.D. (U. Pitt.). Shakespeare and Renaissance drama and literature, Contemporary theatre, Modern American and British drama.
- †Elaine Ginsberg, Ph.D. (U. Okla.). M.A. Supervisor, American literature, Women writers, Feminist theory.
- †Robert Markley, Ph.D. (U. Penn.). Jackson Family Chair in British Literature, Restoration and 18th-century literature, Science studies, Cultural studies.
- †Brian McHale, Ph.D. (Oxford). Ph.D. Supervisor, Eberly Family Professor of American Literature. Postmodernism, American literature, Cultural studies.
- *Thomas H. Miles, Ph.D. (SUNY—Binghamton). Scientific and technical writing, Rhetoric, Online distance learning.
- †Kevin Oderman, Ph.D. (U. Calif.). American poetry, American literature, Creative writing: essay.
- †Frank Scafella, Jr., Ph.D. (U. Chicago). American novel, American romantics, Literature and religion, Science fiction/fantasy.
- †Cheryl B. Torsney, Ph.D. (U. Fla.). American fiction, Henry James, Literary theory, Women writers.

Associate Professors

- †Rudolph P. Almasy, Ph.D. (U. Minn.). Acting Dean. Renaissance and Reformation studies, Composition.
- †Laura Brady, Ph.D. (U. Minn.). Composition and rhetorical theory, Women's studies.
- †Anna Shannon Elfenbein, Ph.D. (U. Nebr.). American literature, Women's studies, Film.
- †John Lamb, Ph.D. (NYU). Assistant Editor, *Victorian Poetry*, Victorian literature and culture, Victorian historiography.
- †Byron C. Nelson, Ph.D. (U. Wisc.). Ranters and religious radicals, Elizabethan, Jacobean, and Restoration drama.
- †Susan Shaw Sailer, Ph.D. (U. Wash.). Irish poetry, James Joyce, Literary theory, Epics.
- †Timothy Sweet, Ph.D. (U. Minn.). American studies (17th-19th-century), Literature and photography, Native American literature.

Assistant Professors

- †Gail Adams, M.A. (U. Texas). American studies, Creative writing.
- †Bernadette Andrea, Ph.D. (Cornell U.). Renaissance and Seventeenth Century studies.
- *Gwen Bergner, Ph.D. (Princeton U.). African-American and Multi-Ethnic literatures.
- *Patricia DeMarco, Ph.D. (Duke U.). Middle English and general Medieval studies.
- †Marilyn Francus, Ph.D. (Columbia U.). Restoration and 18th-century literature and culture, Women's studies, Satire, History of the novel.
- †James Harms, M.F.A. (Indiana U.). Creative writing (poetry), Contemporary poetry.
- *Ethel Morgan Smith, M.A. (Hollins College). Creative writing: fiction, Nonfiction essay, African-American literature.
- †David Stewart, D. Phil. (Oxford U.). British romanticism, Literary theory.
- *Susan Warshauer, Ph.D. (U. of Texas). Humanities computing, drama, and composition.

Foreign Languages

Professors

- *Robert J. Elkins, Ph.D. (U. Kans.). *Emeritus*. German. Language methodology, German radio plays, English as a second language.
- †Kathleen E. McNemey, Ph.D. (U. N. Mex.). Catalan language and literature, Spanish literature and culture.
- †Frank W. Medley, Jr., Ph.D. (Purdue U.). Chairperson. Spanish, Foreign language education.
- †Joseph A. Murphy, Ph.D. *Emeritus*. (Ohio St. U.). Associate Chairperson. French. English as a second language, Foreign language education.
- †Joseph J. Prentiss, Ph.D. (U. Pitt.). *Emeritus*. Classics. Greek and Latin literature, Classical mythology.
- †Janice Spleth, Ph.D. (Rice U.). French. Francophone literature and culture.

Associate Professors

- *Marilyn Bendena, Ph.D. (Wayne St. U.). French, Russian. Russian literature/culture, Contemporary French novel.
- †Jeffrey Bruner, Ph.D. (Rutgers U.). Graduate coordinator. Modern Spanish peninsular literature.
- †Axel W. Claesges, Ph.D. (Vanderbilt U.). German. German cultural and intellectual history, 19th century literature, Commercial German.

- *Ahmed Fahkri, Ph.D. (U. Mich.). TESL. Second language acquisition, Applied linguistics, Discourse analysis.
- *Daniel Ferreras, Ph.D. (Mich. St. U.). Comparative Romance literature. French/Spanish 19th and 20th century novel, Theory of the fantastic.
- *Pablo Gonzalez, Ph.D. (U. Madrid). Spanish. Spanish-American literature, Commercial Spanish.
- *Michael Lastinger, Ph.D. (U. Ga.). French. 19th century French literature, Critical theory.
- *Valerie Lastinger, Ph.D. (U. Ga.). French. 18th century French literature. French women writers.
- *Michael E. Reider, Ph.D. (U. Iowa). Spanish, Linguistics. Syntax and phonology, Psycholinguistics.
- *Joseph F. Renahan, M.S. (Yeshiva U.). *Emeritus*. Spanish. French and Spanish philology, Spanish Golden Age drama.
- *Jurgen Schlunk, Ph.D. (U. Marburg). German. 18th century German literature, 19th and 20th century German drama.

Assistant Professors

- *Maria Amores, Ph.D. (Penn St. U.). Spanish, Foreign language acquisition.
- *Susan Bradi, Ph.D. (U. Del.). ESL, Applied linguistics, Second language acquisition, Syntax.
- *Sandra Dixon, Ph.D. (Brown U.). Spanish, Portuguese literature, Spanish-American literature.
- *Deborah Janson, Ph.D. (U. Cal.). German. The Enlightenment, Romanticism, 20th Century literature, GDR literature, Ecofeminism.
- *Twyla Meding, Ph.D. (U. Va.). French. 16th and 17th century French literature. The pastoral novel.
- *Johan Seynnaeve, Ph.D. (Cornell U.). General linguistics, Sociolinguistics, Phonology.
- *Sharon Wilkinson, Ph.D. (Penn St. U.). French, Foreign language acquisition.

Geology and Geography

Professors

- *Robert E. Behling, Ph.D. (Ohio St. U.). Geomorphology.
- *Frank J. Calzonetti, Ph.D. (U. Okla.). WV EPSCOR Director. Energy and regional development, Industrial location.
- *Alan C. Donaldson, Ph.D. (Penn. St. U.). *Emeritus*. Sedimentation-stratigraphy.
- *Gregory A. Elmes, Ph.D. (Penn. St. U.). GIS, Spatial modeling, Energy and environment.
- *Trevor M. Harris, Ph.D. (U. Hull). Chairperson. Geographic information systems.
- *Milton T. Heald, Ph.D. (Harvard U.). *Emeritus*. Mineralogy and petrology.
- *Thomas W. Kammer, Ph.D. (Ind. U.). Paleontology.
- *Kenneth C. Martis, Ph.D. (U. Mich.). Political geography, Historical geography.
- M. Duane Nellis, Ph.D. (Oregon State U.). Satellite Remote Sensing, Natural resources.
- *Henry W. Rauch, Ph.D. (Penn St. U.). Hydrogeology and geochemistry.
- *John J. Renton, Ph.D. (WVU). Geochemistry.
- *Robert C. Shumaker, Ph.D. (Cornell U.). *Emeritus*. Petroleum geology.
- *Richard A. Smosna, Ph.D. (Ill. U.). Carbonate sedimentation.
- *Thomas H. Wilson, Ph.D. (WVU). Geophysics.

Associate Professors

- *Robert Q. Hanham, Ph.D. (Ohio St. U.). Urban and regional systems, Research methods.
- *Ronald Harris, Ph.D. (V. College, London). Structural geology.
- *J. Steven Kite, Ph.D. (U. Wisc.). Geomorphology.
- *Helen Lang, Ph.D. (U. Ore.). Petrology and mineralogy.
- *Ann M. Oberhauser, Ph.D. (Clark U.). Economic restructuring, Gender studies, Europe.
- *Daniel Weiner, Ph.D. (Clark U.). Director, Office of International Programs. Development geography. Political ecology, Africa.

Assistant Professors

- *Joseph Donovan, Ph.D. (Penn. St. U.). Hydrogeology and geochemistry.
- *Calvin Masilela, Ph.D. (VPI). Planning, International development and land use policy.
- *Timothy A. Warner, Ph.D. (Purdue U.). Remote sensing.

History

Professors

- *Wesley M. Bagby, Ph.D. (Columbia U.). Recent U.S., U.S. diplomatic, Sino-American relations.
- *Robert E. Blobaum, Ph.D. (U. Nebr.). Russia, East Europe, Poland, 20th-century political and social history.

- †Jack L. Hammersmith, Ph.D. (U. Va.). Modern U.S., U.S. diplomatic, U.S.-Japanese relations.
- †Ronald L. Lewis, Ph.D. (U. Akron). Eberly Professor. Modern U.S., West Virginia/Appalachia, Labor, South.
- †Robert M. Maxon, Ph.D. (Syracuse U.). Africa, East Africa, economic and imperial.
- †Stephen C. McCluskey, Ph.D. (U. Wisc.). Medieval Europe, History of Science, Astronomies of traditional cultures.
- †John R. McKivigan, Ph.D. (Ohio State U.). 19th-century U.S., Ethnic history, popular culture, American reform movements.
- †John C. Super, Ph.D. (UCLA). Latin America, Spain, Biography, Food and agriculture.

Associate Professors

- *William S. Arnett, Ph.D. (Ohio State U.). Ancient, Egyptology, aging and the elderly in the ancient Middle East.
- †Helen M. Bannan, Ph.D. (Syracuse U.). U.S. Women, Native Americans.
- †Amos J. Beyan, Ph.D. (WVU). West Africa, African diaspora, African-American.
- †Elizabeth A. Fones-Wolf, Ph.D. (U. Mass). Modern U.S., 20th-century economic and social, Business.
- †Gregory A. Good, Ph.D. (U. Toronto). History of Science, 18th- and 19th-century science, History of instruments and scientific institutions.
- †Barbara J. Howe, Ph.D. (Temple U.). Chairperson. Modern U.S., Public History, U.S. urban and women.
- †Mary Lou Lustig, Ph.D. (Syracuse U.). Colonial and revolutionary U.S., Political and cultural, 17th- and 18th-century England, U.S. constitutional.
- †A. Michal McMahon, Ph.D. (Texas). 18th- and 19th-century U.S. environmental history, History of Technology.
- †Steven M. Zdatny, Ph.D. (U. Penn). Modern Europe, France, Social.

Assistant Professors

- *Katherine Aaslestad, Ph.D. (U. Ill.). Europe, Germany, Cultural, Urban, and International relations.
- †Steven J. Ericson, Ph.D. (Harvard U.). Japan, East Asia.
- †Caroline J. Litzenberger, Ph.D. (Cambridge U.). Early Modern Europe, England, European women, history and computing.
- *Jose V. Pimienta-Bey, Ph.D. (Temple U.). African-American, North Africa.
- *Mark B. Tauger, Ph.D. (UCLA). Russian/Soviet, Modern Europe, Environmental.

Adjunct Faculty

Katherine Bankole
Kenneth Fones-Wolf
Sally Ward Maggard
Roger Yeager

Mathematics

Professors

- †Ian Christie, Ph.D. (Dundee U.). Numerical partial differential equations.
- †Harvey R. Diamond, Ph.D. (MIT). Applied probability.
- †Harry Gingold, D.Sc. (Israel Inst. Tech.). Differential equations, Perturbation methods, Asymptotic methods.
- †Henry W. Gould, M.A. (U. Va.). Combinatorics, Number theory, Special functions.
- Jack Goodykoontz, Ph.D. (U. Ky.). Topology.
- *Caulton L. Irwin, Ph.D. (Emory U.). Associate Director, Energy Research Center. Variational methods, Optimization, Applied mathematics.
- †Jin Bai Kim, Ph.D. (VPI & SU). Emeritus. Algebra, Semigroups.
- †Dening Li, Ph.D. (Fudan U.). Partial differential equations.
- †Larry N. Mann, Ph.D. (U. Penn.). Topology, Geometry.
- †Michael E. Mays, Ph.D. (Penn. St. U.). Number theory.
- †Sam B. Nadler, Jr., Ph.D. (U. Ga.). Continuum theory.

- †William H. Simons, Ph.D. (Carnegie-Mellon U.). Analysis, Differential equations, Applied mathematics.
 †Cun-Quan Zhang, Ph.D. (Simon Fraser U.). Combinatorics, Graph theory.

Associate Professors

- †Krzysztof Ciesielski, Ph.D. (Warsaw U.). Analysis, Topology.
 †Weifu Fang, Ph.D. (Claremont). Applied Mathematics.
 †Gary Ganser, Ph.D. (RPI). Applied mathematics, Fluid mechanics.
 †John Goldwasser, Ph.D. (U. Wisc.). Combinatorics, Linear algebra.
 †Harumi Hattori, Ph.D. (RPI.). Differential equations, Continuum mechanics, Numerical analysis.
 †Andrzej Karwowski, Ph.D. (Rutgers U.). Continuum mechanics.
 †Hong-Jian Lai, Ph.D. (Wayne St. U.). Combinatorics, Graph theory.
 †James E. Miller, Ph.D. (U. Ky.). Complex analysis.
 †James L. Moseley, Ph.D. (Purdue U.). Partial differential equations.
 John W. Randolph, Ph.D. (U. Va.). Algebra.
 †Joseph Wilder, Ph.D. (RPI). Applied mathematics.
 †Jerzy Wojciechowski, Ph.D. (Cambridge U.). Combinatorics, Graph theory.

Philosophy

Professors

- †Ralph W. Clark, Ph.D. (U. Colo.). Ethics, Business ethics, Metaphysics.
 †Theodore M. Drange, Ph.D. (Cornell U.). Philosophy of religion, Epistemology.
 †Mark R. Wicclair, Ph.D. (Columbia U.). Philosophy of law, Medical ethics, Ethics.

Associate Professors

- †Richard A. Montgomery, Ph.D. (U. Ill.-Chicago). Chairperson. Philosophy of mind/cognitive science, Philosophy of science.
 †Daniel Shapiro, Ph.D. (U. Minn.). Social and political philosophy, Ethics, Philosophy of law.

Physics

Professors

- †Bernard R. Cooper, Ph.D. (U. Calif.). Benedum Professor of Physics. Condensed matter and materials theory.
 †Boyd F. Edwards, Ph.D. (Stanford U.). Fluid dynamics, Combustion processes, Percolation theory.
 †Martin V. Ferer, Ph.D. (U. Ill.). Phase transitions and critical phenomena, Theory.
 †Larry E. Halliburton, Ph.D. (U. Mo.). Chairperson. Solid state physics, Experiment.
 Richard T. Kouzes, Ph.D. (Princeton U.). Nuclear physics, Physics education.
 †John E. Littleton, Ph.D. (U. Rochester). Astrophysics.
 Carl A. Rotter, Ph.D. (Case W. Res. U.). Eberly Professor. Neutron scattering, Physics education.
 †Mohindar S. Seehra, Ph.D. (U. Rochester). Eberly Professor. Magnetic, electronic, optical properties of solids, Experiment.
 †H. Arthur Weldon, Ph.D. (MIT). Particle physics, Quantum fields, Theory.

Associate Professors

- †Wathiq Abdul-Razzaq, Ph.D. (U. Illinois-Chicago Circle). Solid state physics, Experiment.
 †Nancy C. Giles, Ph.D. (N.C. St. U.). Optical properties of semiconductors, Experiment.
 †Mark E. Koepke, Ph.D. (U. Maryland). Plasma physics, Experiment.
 †Thomas H. Myers, Ph.D. (N.C. St. U.). MBE growth of II-VI semiconductors.

Assistant Professors

- †David Lederman, Ph.D. (U. Calif.-Santa Barbara). Condensed matter physics, Experiment.
 †Leonardo Golubovic, Ph.D. (Belgrade U.). Condensed matter theory and statistical physics.
 †Earl E. Scime, Ph.D. (U. Wisc.-Madison). Plasma physics, Experiment.

Political Science

Professors

- †Robert E. DiClerico, Ph.D. (Ind. U.). Director of Undergraduate Studies. American politics, Presidential politics, Political parties, Electoral behavior, Public policy (Agenda setting).
 †Robert Dilger, Ph.D. (Brandeis U.). Director, Institute for Public Affairs. Intergovernmental relations, State and local government, Congress.

†Joe D. Hagan, Ph.D. (U. Ky.). International relations and world politics, Foreign policy analysis.

†Hong N. Kim, Ph.D. (Georgetown U.). Comparative politics (Asia), Comparative public policy.

†Donley Studlar, Ph.D. (Ind. U.). Eberly Distinguished Professor. British politics, Comparative politics (European and English-speaking regimes), Gender and ethnic politics.

†Rodger D. Yeager, Ph.D. (Syracuse U.). Comparative politics, (Africa), Political development.

Associate Professors

†Richard A. Brisbin, Jr., Ph.D. (Johns Hopkins U.). Public law and judicial politics, Public policy (Criminal justice and regulation).

†Robert D. Duval, Ph.D. (Fla. St. U.). Methodology, International politics and policy, Public policy (Energy, environmental, foreign).

†Allan H. Hammock, Ph.D. (U. Va.). Chairperson. American government, Public policy (Civil rights, health care).

†Susan Hunter, Ph.D. (Ohio St. U.). Public policy (Environment, policy design, ethics), Contemporary political theory.

†John Kilwein, Ph.D. (Ohio St. U.). Public law, Judicial politics, Public policy, Public administration.

†Kevin Leyden, Ph.D. (U. Iowa). Congress, Political behavior, Interest groups, Research methods.

†Christopher Z. Mooney, Ph.D. (U. Wisc.). State politics, Research methods, Legislative politics.

Jeffrey S. Worsham, Ph.D. (U. Wisc.). Public policy (regulation, social welfare), Bureaucratic politics and public administration.

Assistant Professors

†Neil Berch, Ph.D. (U. Wash.). Public policy (political economy), American politics (state and local).

*Paul Hoyt, M.A. (Ohio St. U.). Comparative politics (Middle East), International relations, U.S. Foreign Policy.

Psychology

Professors

†Philip N. Chase, Ph.D. (U. Mass.). Chairperson. Verbal behavior, Concept learning, Individualized instruction, Organizational behavior management.

†Stanley H. Cohen, Ph.D. (Mich. St. U.). Quantitative methods, Applications of computers in behavioral sciences, Multivariate analysis. Survey and evaluation research.

*Philip E. Comer, Ph.D. (WVU). Emeritus. Adjustment and developmental aspects of college life, Counseling and psychotherapy, Psychopathology, Diagnostic methods.

†Barry A. Edelstein, Ph.D. (Memphis St. U.). Social competence, Behavioral assessment, Behavior therapy.

†Georg H. Eifert, Ph.D. (U. Frankfurt, Germany). Eberly Distinguished Professor. Models and treatments of anxiety disorders, Conceptual advances in behavior therapy, Clinical applications of classical conditioning principles.

†William J. Fremouw, Ph.D. (U. Mass.). Cognitive-behavioral therapy, Eating disorders.

†Robert P. Hawkins, Ph.D. (U. Pitt.). Emeritus. Behavior analysis of child behavior, Behavioral assessment, Child treatment programs.

Daniel E. Hursh, Ph.D. (U. Kansas). Educational psychology, Personalized systems of instruction, Language evaluation.

†Kennon A. Lattal, Ph.D. (U. Ala.). Centennial Professor. Experimental analysis of behavior, Behavior theory and philosophy, History of psychology.

Joseph Panepinto, Ph.D. (WVU). Community psychology, Program development and evaluation.

†Michael Perone, Ph.D. (U. Wisc.-Milwaukee). Associate Chairperson. Basic processes in the operant behavior of humans and animals, Research methodology, Laboratory application of microcomputers, Radical behaviorism.

†Hayne W. Reese, Ph.D. (U. Iowa). Centennial Professor. Cognitive development across the lifespan, Lifespan research methodology, Philosophical analysis.

†Richard J. Seime, Ph.D. (U. Minn.). Adult behavior therapy and assessment, Eating disorders, Mood disorders.

James N. Shafer, Ph.D. (Ohio St. U.). Emeritus. Behavior analysis.

R. T. Walls, Ph.D. (Penn State U.). Educational psychology, Human learning, Vocational Rehabilitation.

Associate Professors

- [†]Andrew S. Bradlyn, Ph.D. (U. Miss.). Pediatric behavioral medicine, Child behavior therapy and assessment.
James Capage, Ph.D. (Ohio U.). Clinical assessment, Psychotherapy, Abnormal behavior.
[†]Virginia L. Goetsch, Ph.D. (U. Ga.). Behavioral medicine, Psychophysiology of stress, Anxiety disorders.
[†]Irving J. Goodman, Ph.D. (U. Rochester). Neural mechanisms of behavior, Psychopharmacology, Behavioral neuroscience.
[†]Carol V. Harris, Ph.D. (U. Fla.). Child and adolescent behavior therapy, Adolescent substance abuse, Pediatric behavioral medicine.
[†]Katherine Hildebrandt Karraker, Ph.D. (Mich. St. U.). Infant social development, Physical appearance effects on development, Parent-infant relations.
[†]Kevin Larkin, Ph.D. (U. Pitt). Behavioral assessment and treatment of anxiety-related disorders, Relationship between cardiovascular reactivity and cardiovascular disease.
Alice Darnell Lattal, Ph.D. (WVU). Organizational behavior management.
*John C. Linton, Ph.D. (Kent U.). Behavioral medical psychology, Crisis intervention.
[†]Daniel W. McNeil, Ph.D. (U. Ala.). Director of Clinical Training. Experimental psychopathology, Fear, Anxiety, Phobia.
[†]Vernon Odom, Ph.D. (U. N.C.). Abnormal and normal visual development.
[†]B. Kent Parker, Ph.D. (U. Utah). Conditioning and learning, Animal cognition, Stimulus control and memory, Research design and statistics.
[†]David W. Schaal, Ph.D. (U. Fla.) Behavioral pharmacology, delayed reinforcement, radical behaviorism.
[†]Joseph R. Scotti, Ph.D. (SUNY-Binghamton). Mental retardation and developmental disabilities, AIDS prevention, Behavioral systems, Standards of practice, Treatment of survivors of trauma.

Assistant Professors

- [†]Christina D. Adams, Ph.D. (Louisiana State U.). Adolescent psychopathology, Test construction, Pediatric psychology.
Dennis Becotte, Ph.D. (U. Pitt.). Federal corrections.
Martin Boone, Ph.D. (Okla. St. U.). Behavioral medicine, Clinical neuropsychology.
David Brunetti, Ph.D. (Okla. St. U.). Individual and group psychotherapy, Psychological assessment, Forensic evaluation
Jeannie Sperry Clark, Ph.D. (Ohio U.). Factors associated with successful placement and improvement of psychiatric inpatients, Ethical decisions in psychotherapy.
Bruce Corsino, Ph.D. (Fla. Inst. Tech.). Ethics and psychology, Informed consent, End-of-life treatment issue.
[†]John Crosbie, Ph.D. (Flinders U. South Australia). Human operant behavior, Programmed instruction, Statistical analysis of single-subject data.
Lydia Eifert-McLarnon, Ph.D. (Concordia U.). Illness behavior, Chronic and acute pain, Women's health issues.
Jeffrey Hammond, Ph.D. (U.S. International U.). Supervision, Forensic psychology, Psychotherapy.
[†]Jennifer Haut, Ph.D. (U. North Dakota). Behavioral medicine.
[†]Marc Haut, Ph.D., (U. North Dakota). Behavioral medicine.
Alfred Kasprovicz, Ph.D. (U. Pitt.). Behavioral medicine, Psychophysiology.
Donald K. Kincaid, Ed.D. (WVU.). Developmental disabilities, Positive behavior support, Personal futures planning.
Jan M. Kouzes, Ed.D. (Indiana U.). Psychotherapy with individuals, couples, families, groups.
[†]Cheryl B. McNeil, Ph.D. (U. Fla.). Disruptive behavior disorders of children, Assessment, Parent-child interactions.
[†]Tracy L. Morris, Ph.D. (U. Miss.). Peer relationships and social anxiety in children, Parent-child interactions, Internalizing disorders in children.
[†]Anne Watson O'Reilly, Ph.D. (U. Mich.). Cognitive development in young children, Representational ability, Symbolic thought
Ruth Ann Pannepinto, Ph.D. (WVU). Community psychology.
[†]Jerry B. Richards, Ph.D. (Emory U.). Impulsive behavior, Drug abuse, Behavioral pharmacology, Behavioral neuroscience, Animal models of psychopathology.
Brian H. Sharp, Ph.D. (WVU). Clinical neuropsychology and rehabilitation, Traumatic brain injury.

Julie Smith, Ph.D. (WVU). Organizational performance systems, Innovation and creativity, Training systems.

Nina Spadaro, Ed.D. (WVU). Family and marriage maintenance during incarceration, Group therapy.

Thomas J. Spencer, Ph.D. (WVU). Organizational behavior management.

†JoNell Strough, Ph.D. (U. Utah). Problem-solving and interpersonal relationships across the life span, Interpersonal processes in aging.

Mark D. Weist, Ph.D. (Va. Poly. Inst. and St. U.). School-based mental health services.

Leslie Wilk, Ph.D. (W. Mich. U.). Organizational behavior management, Performance management and leadership.

Christina Sara Wilson, Ph.D. (Wayne St. U.). Clinical neuropsychology, Dementia, Head Injury.

Public Administration

Professors

†Gerald M. Pops, Ph.D. (Syracuse U.), J.D. (U. Calif.). Personnel, Public law.

†David G. Williams, Ph.D. (SUNY Albany) Chairperson. Public organization, Management.

Associate Professors

†Kenneth A. Klase, D.P.A. (U. Ga.). Public budgeting and finance, Public policy analysis, Planning.

Assistant Professors

Nancy Adams, M.S.N. (U. Md.). Healthcare administration.

L. Christopher Plein, Ph.D. (U. Mo.). Public policy, Legal and Political foundations.

Soo Geun Song, D.P.A. (U. Ga.). Research methods, Public budgeting and finance, Policy analysis.

Sociology and Anthropology

Professors

†Ronald C. Althouse, Ph.D. (U. Minn.). Chairperson, Sociology. Theory, Work, Occupational safety and health.

†Richard A. Ball, Ph.D. (Ohio St. U.). Sociology. Deviant behavior, Criminology, Social psychology.

†Jerold M. Starr, Ph.D. (Brandeis U.). Sociology. Life course, Social movements, Sociology of knowledge.

Associate Professors

†Sally W. Maggard, Ph.D. (U. Ky.). Sociology. Appalachian studies, Gender, Work, Social change.

†Lawrence T. Nichols, Ph.D. (Boston C.). Sociology. Criminology, Sociology of business, Theory, Qualitative methods.

†Ann L. Paterson, Ph.D. (Mich. St. U.). Sociology. Education, Sex roles, Socialization.

†Patricia Rice, M.A. (Ohio St.). Anthropology. Prehistoric art, Physical archaeology.

†Kenyon R. Stebbins, Ph.D. (Mich. St. U.). Anthropology. Medical anthropology, Latin America, Political economy of history.

Assistant Professors

Melissa Latimer, Ph.D. (U. Ky.). Sociology. Stratification and inequality, Poverty, Labor market analysis, Work and occupations, Gender and race issues, Sociology of sports, Violence against women.

F. Carson Mencken, Ph.D. (LSU). Sociology. Stratification, Work and labor markets, Industrial, Job matching, Networks.

Gretchen Stiers, Ph.D. (U. of Mass.). Sociology. Medical sociology, Health, Aging, Family, Gender relations.

Statistics

Professors

†Erdogan Gunel, Ph.D. (SUNY-Buffalo). Bayesian inference, Biostatistics, Categorical data analysis.

†E. James Harner, Ph.D. (Cornell U.). Chairperson. Dynamic graphics, Statistical computing, Statistical modeling, Statistical education.

†William V. Thayne, Ph.D. (U. Ill.). Experimental design, Statistical genetics, Regression analysis.

†Edwin C. Townsend, Ph.D. (Cornell U.). Experimental design, Regression analysis.

¹Stanley Wearden, Ph.D. (Cornell U.). Emeritus. Biostatistics, Statistical genetics, Population biology.

Associate Professors

*Daniel M. Chilko, M.S. (Rutgers U.). Statistical computing, Computer graphics.

¹Gerald R. Hobbs, Jr., Ph.D. (Kansas St. U.). Biostatistics, Nonparametric statistics, Regression analysis.

¹Magdalena Niewiadomska-Bugaj, Ph.D. (Adam Mickiewicz U., Poznan, Pol.). Classification, Categorical data analysis, Statistical computing.

Adjunct Associate Professors

Michael D. Attfield, Ph.D. (WVU). Design and analysis of experiments.

James T. Wassell, Ph.D. (Ohio St. U.). Biostatistics, Survival analysis, Nonparametric statistical methods.

Women's Studies

Professor

*Judith G. Stitzel, Ph.D. (U. Minn.). Women's studies, Feminist pedagogy, Creative writing.

Associate Professor

Helen M. Bannan, Ph.D. (Syracuse U.). Director. Women's Studies, American Indian history.

Visiting Assistant Professor.

Barbara Scott Winkler, Ph.D. (U. Mich.). Women's studies, Feminist pedagogy, History of sexuality.

Biology

Keith Garbutt, Chairperson of the Department

200 Brooks Hall

Degrees Offered: Master of Science, Doctor of Philosophy

The Department of Biology offers graduate studies leading to the degrees of doctor of philosophy and master of science. The doctor of philosophy degree is offered in the area of cellular and molecular biology and in the area of environmental plant biology, with research concentration in the areas of gene regulation and transcriptional control during development; genetic analysis of circadian rhythms; positional effects on gene expression; cellular and molecular bases of regulation of cell proliferation; pheromonal communication; bone cell differentiation; endocrinology of reproduction; analysis of protein kinases; molecular biology of aging; uses of remote sensing in evaluation of forest health; population and ecological genetics of plants; environmental stress physiology; mycorrhizal-plant interactions and physiological, population, community and ecosystem ecology with an emphasis on global climate change, regional environmental issues and conservation of biodiversity. The master of science provides specialization in animal behavior as well as in cellular and molecular biology and environmental plant biology as listed above. Each degree requires completion of an original research project which represents the principal theme about which the graduate program is constructed.

Master of Science

Prerequisites and Requirements Applicants for the master of science program in biology must show at the minimum the equivalent of a bachelor's degree from an accredited institution, an undergraduate grade-point average of 3.0, a 50th percentile ranking for the verbal, quantitative, and analytical sections of the Graduate Record Examination; an adequate science background, which normally includes one year of physics and two years of chemistry; and a sufficient knowledge in biology as reflected in scores normally greater than the 50th percentile on all three sections of the GRE subject test in Biology. Applicants are requested to submit a one—page essay describing past research experience and expectations for career goals. Three letters of recommendation from individuals

familiar with the applicant's academic performance are required as well as official transcripts from all colleges or universities attended. The Department of Biology's Graduate Committee reviews the applicant's records and makes the admission decisions.

The WVU general requirements for the master of science are outlined elsewhere in the graduate catalog. Students in the biology M.S. program may apply up to six hours of research credit toward the 30-hour requirement; the remaining 24 hours of credit must be earned in graduate courses which reflect a diversified exposure to biology. The establishment of an advisory committee and the generation of a program of study are explained in detail in the department's *Graduate Student Handbook*. A final oral examination is administered by the advisory committee after the program of study has been completed and the thesis has been submitted.

Doctor of Philosophy

Program The program for the degree of doctor of philosophy concentrating in cellular and molecular biology, or in environmental plant biology, reflects a flexible, research-oriented approach geared to develop the interests, capabilities, and potentials of mature students. Applicants must have met all the entrance requirements listed above for the master of science program. Acceptance into the Ph.D. program is by vote of the Graduate Committee of the Department of Biology. This committee ensures that all entrance requirements are met or that provisions have been made to remedy the deficiencies, and that facilities and personnel are adequate to support the program to a successful conclusion.

Each student admitted to the Ph.D. program works under the close supervision of a faculty research advisor and an advisory committee; details on the composition and establishment of an advisory committee are available in the *Graduate Student Handbook*. Students must have a program of study formulated and approved within 12 months of entering the Ph.D. program; all deficiencies must have been removed earlier. Significant deviations from an established program of study require approval from the advisory committee and the graduate committee.

Examinations and Dissertation Proposal The advisory committee is responsible for overseeing the progress of the student and for administering and judging performance in the required examinations; it ensures that all Department of Biology, College of Arts and Sciences, and University requirements are met during the course of the student's program of study. The program of study outlines the course work to be taken in support of the proposed research.

Students must successfully complete a Preliminary Exam and Proposal Exam before being promoted to candidacy for the Ph.D. The Preliminary Exam is given by the end of the fourth semester in residence and consists of two parts, a Written Exam and an Oral Exam. The Proposal Exam is taken by the end of the fifth semester in residence and consists of a written dissertation research proposal, which is also orally presented before the department.

Candidacy Successful passage of the Preliminary and Proposal examinations leads to promotion to candidacy, wherein the student may concentrate fully upon the dissertation research and prepare for the final examination. The final examination consists of the submission of a completed and acceptable written dissertation and an oral dissertation defense. A formal departmental seminar covering the dissertation research must be presented before graduation.

Biology (BIOL)

201. *History of Biology*. I. 3 HR. PR: (BIOL 1 and BIOL 3 and BIOL 2 and BIOL 4) or BIOL 15. History of development of biological knowledge, with philosophical and social backgrounds.

209. *Topics and Problems in Biology*. I, II, S. 1-4 HR. (May be repeated for a max. of 6 HR.) PR: Permission required. Topics and problems in contemporary biology. All topics or problems must be selected in consultation with the instructor.

210. *Biometry*. 3 hr. PR: STAT 101. Application of quantitative methods and statistics to biological data, with emphasis on hands-on hypothesis construction, experimental design, data analysis and biological interpretation of statistical results. Lec-3 hrs/Lab-0 hrs/Contact-3 hrs.

211. *Advanced Cellular/Molecular Biology*. II. 3 HR. PR: BIOL 19. Advanced study of fundamental cellular activities and their underlying molecular processes. Cellular structure and organization, protein structure and function, transcription, translation, and control of gene expression.

212. *Advanced Cellular/Molecular Biology-Laboratory*. II. 1 HR. Coreq: BIOL 211. Experimental approaches to the study of cellular systems.

213. *Introduction to Virology*. I. 3 HR. PR: BIOL 19. Survey of viruses; their modes of replication; contributions made to molecular biology, significance of viral diseases in agriculture and medicine, and contemporary use of viruses in biotechnology. 3 HR. Lec.

214. *Molecular Basis of Cellular Growth*. I. 3 HR. PR: BIOL 19. Study of the integration of events as they regulate the growth and division of cells. Topics include: hormones as cell effectors, and the cancer cell as a model system.

216. *Cell and Molecular Biology Methods*. I. 3 HR. PR: BIOL 19. Introduction to the theory and application of basic analytical tools used in molecular biology. Selected topics included are: hydrodynamic methods, chromatography, electrophoresis, and general laboratory methods. (Offered in even years.)

219. *Introduction to Recombinant DNA*. I. 4 HR. PR: BIOL 19. An introductory course covering the basic principles and techniques of recombinant DNA technology. Includes molecular cloning, isolation of plasmid DNA, agarose/acrylamide gel electrophoresis, restriction enzyme mapping, nucleic acid hybridization, and DNA sequencing.

221. *Molecular Genetics*. II. 4 hr. PR: BIOL 15, 17, 19. Theoretical and practical knowledge in genetics, as a field of study and tool for investigating biological problems, are presented. The laboratory is a logical sequence of experiments providing an actual research experience in molecular genetics. Lec-3 hrs/Lab-3 hrs/Contact-6 hrs.

222. *Cell Structure and Function*. 4 hr. ; PR: BIOL 21. Students have hands-on experiences in methodologies used to study cell structure and function. Light and fluorescence microscopy are used to address cell signaling, signal transduction, exocytosis, apoptosis, and regulation of gene expression in reproductive endocrinology. Lec-3 hrs/Lab-3 hrs/Contact-6 hrs.

223. *Developmental Biology*. II. 4 hr . PR: BIOL 15, 17, 19. A molecular genetic analysis of the mechanisms by which multicellular organisms develop from single cells. Lec-3 hrs/Lab-4 hrs/Contact-7 hrs.

231. *Animal Behavior*. I. 4 HR. PR: BIOL 21 and ((BIOL 1 and BIOL 3 and BIOL 2 and BIOL 4) or BIOL 15). Introduction to animal behavior (ethology), emphasizing the ecology and evolution of individual and social behaviors. Laboratory includes independent investigation of behavioral phenomena. Given in even-numbered years.

232. *Physiological Psychology*. I. 3 HR. PR: 9 HR. Psychology, behavior, physiology, or graduate standing. Introduction to physiological mechanisms and the neural basis of behavior. (Also listed as PSYC 232.)

233. *Behavioral Ecology*. 3 HR. PR: BIOL 21. Consideration of the influences of environmental factors on the short and long term regulation, control, and evolution of the behaviors of animals.

234. *Neuroethology*. II. 3 HR. PR: BIOL17 and 19 and (BIOL 231 or BIOL 232). Explores the way behavior is controlled in a wide variety of animals, so the similarities and differences in neural mechanisms can be better understood. Given in odd-numbered years.

240. *Methods in Ecology and Biogeochemistry*. II. 3 HR. PR: BIOL 21. Introduction to the theory and application of basic analytical tools used in ecology and biogeochemistry. Topics include sampling of terrestrial and aquatic organisms and their environment, and chemical analyses of biological materials. (Offered in odd years.)

243. *Plant Ecology*. I. 4 HR. PR: BIOL 21. Introduction to the four divisions of plant ecology, including physiological, population ecology, community ecology, and ecosystem ecology. (Offered in odd years.)

244. *Global Ecology*. I. (odd-num. yrs.) 3 HR. PR: BIOL 21. The Earth viewed as a changing biogeochemical system. Topics include: the structure, composition and dynamics of the ecosphere; nutrient cycles; changing atmospheric composition; climate change; ozone depletion; land-use change; biological invasions; and changes in biodiversity.

246. *Limnology*. I. 4 HR. PR: BIOL 21. Physical, chemical, and biological characteristics of inland waters with an introduction to the principles of biological productivity.

247. *Aquaculture*. 3 HR. PR: (BIOL 1, 3 and 2, 4) or BIOL 15. An introduction to the farming and husbandry of freshwater and marine organisms. Overnight field trips are voluntary. (Offered in odd years.)

248. *Comparative Evolutionary Biology of Plants*. I. 4 HR. PR: BIOL 1 and BIOL 3 and BIOL 2 and BIOL 4. Evolutionary history, morphology, life cycles, and ecology of extant and extinct groups, including: cyanobacteria, lichens, algae (green, red, and brown), bryophytes, ferns, fern allies, gymnosperms, and angiosperms. Laboratories emphasize comparative analysis of living specimens. One or two field trips at student's expense.

249. *Plant Systematics*. I. 4 HR. PR: BIOL 1 and BIOL 3 and BIOL 2 and BIOL 4 or BIOL 17. Study of the taxonomy of flowering plants worldwide and related topics in angiosperm classification and evolution. Laboratories emphasize characteristics of selected families of monocotyledons and dicotyledons, using living and herbarium material. (5-contact hours)

251. *Principles of Evolution*. I. 3 HR. PR: BIOL 21. Introduction to the study of evolution, including genetics of evolutionary change, speciation and adaptation molecular evolution, the history of life, extinction, co-evolution, and the origins of humans.

252. *Flora of West Virginia*. S. 3 HR. PR: (BIOL 1, 3 and 2, 4.) or BIOL15. Identification of local woody and herbaceous seed plants, focusing on common native and introduced species. Conducted primarily through field trips to nearby areas with the use of dichotomous keys to determine the scientific names of observed specimens.

253. *Anatomy and Development of Plants*. II. 4 HR. PR: BIOL 17 or PLSC 52. A comparative study of vegetative and reproductive structures (cells, tissue, and organs) of bryophytes and vascular plants, with emphasis on flowering plants. Laboratories focus on living plants, and include observation of plant development from spores, seeds, and cuttings. One field trip.

254. *Plant Geography*. II. 3 HR. PR: BIOL 21. World-wide distribution patterns of plants and factors related to these distributions—including dispersal. Limiting factors, climate, isolation, evolutionary history, plate tectonics, pleistocene glaciations, and human activities. Plant communities and soils of polar, temperate and tropical biomes are discussed.

255. *Invertebrate Zoology*. II. 4 HR. PR: BIOL 19 and 21. The evolution of animals without vertebral columns. The laboratory includes field trips, including one that takes an entire weekend. (Dissection kit required.) Given in odd-numbered years.

257. *Ichthyology*. II. 3 HR. PR: BIOL 17. Internal and external structure of fishes, their systematic and ecological relationships, and their distribution in time and space. (Dissection kit required.)

259. *Parasitology*. 4 HR.

260. *Plant Development*. I. 4 HR. PR: BIOL 15, 17, 19, and 21 and (organic chemistry or biochemistry.) Experimental studies of plant growth and development.

261. *Comparative Anatomy*. I. 4 HR. PR: BIOL 15, 17, 19, and 21 or consent. A functional and evolutionary study of vertebrate structure. (Dissection kit required.)

262. *Vertebrate Embryology*. II. 4 HR. PR: BIOL 15, 17, 19, and 21. An experimental and descriptive analysis of vertebrate development.
263. *Vertebrate Microanatomy*. II. 5 HR. PR: BIOL 15, 17, 19, and 21. Structural and functional approach to the study of tissues and organs of vertebrates.
268. *Molecular Endocrinology*. I. 3 HR. PR: BIOL 21 Hormonal action is discussed at the cellular and molecular levels. Topics include hormone production and regulation, receptor kinetics and activation, and receptor out put.
269. *Molecular Endocrinology - Laboratory*. I. 1 HR. Coreq: BIOL 268. Experimental techniques used to study hormones and receptors.
270. *General Animal Physiology*. I. 3 HR. PR: BIOL 15, 17, 19, and 21. In-depth, current treatment of physiological principles which operate at various levels of biological organization in animals of diverse taxonomic relationships. Understanding is developed from background lectures and student analysis in discussion sessions of research literature.
271. *General Animal Physiology-Laboratory*. I. 1 HR. Coreq: BIOL 270. After learning basic techniques, students are provided the opportunity to design, execute, and report upon an independent research project in physiology.
309. *Topics and Problems in Biology*. I, II, S. 1-4 HR. PR: Consent. Topics and problems in contemporary biology, to be selected in consultation with instructor.
311. *Biology Seminar*. I, II. 1 HR. Discussions and presentations of general interest to biologists.
314. *Molecular Cell Biology*. II. 3 HR. PR: Consent. An advanced course presenting contemporary methodologies and their application to study of problems in cellular organization, molecular genetics, and developmental biology. Introduction to the research literature is stressed.
315. *Molecular Basis of Virology*. I. 3 HR. PR: BIOL 19 or equiv., or consent. Lectures on bacterial, animal, and plant viruses; their structure, replication, and interaction with host cells. Discussion of the contributions virology has made to the understanding of molecular mechanisms in biology.
320. *Molecular Biology of the Gene*. 3 HR. PR: BIOL 19 or consent. Comprehensive survey of basic principles, theories, and techniques of molecular biology, including structure/function of nucleic acids, DNA replication, transcription, translation, recombination, gene regulation, and function. 3 HR. lec.
324. *Cell Structure and Function*. 4 HR.; PR: Graduate level status. Students have a hands-on experience in methodologies used to study cell structure and function. Light and fluorescence microscopy are used to address cell signaling, signal transduction, exocytosis, apoptosis, and regulation of gene expression in reproductive endocrinology. Lec-3 hrs/Lab-3 hrs/Contact-6 hrs.
340. *Ecosystem Dynamics*. I. 3 HR. PR: Consent. A survey of our current understanding of the biogeochemistry that occurs at and near the surface of the Earth. Emphasis is placed on the biogeochemical cycles of carbon, nitrogen, phosphorus, and sulfur. The origin and dynamics of the atmosphere, lithosphere and hydrosphere are also considered. (Offered in even-numbered years.)
341. *Plant Population Biology*. 3 HR.; PR: Graduate Status or Undergraduate Status with the completion of Biology 21 and the Instructor's Permit. Plant Population Biology examines the interplay of ecological theory and the real world of experimental ecology of natural populations using a case study approach. Each student will research a current topic in greater depth. Lec-3 hrs/Lab-0 hrs/Contact-3 hrs.
345. *Fisheries Science*. II. 4 HR. PR: BIOL 257 or equiv., or consent. Population dynamics in relation to principles and techniques of fish management. (Offered in spring of even years.)
355. *Advanced Plant Systematics 1*. II 3 HR. PR: BIOL 151 or equiv. Taxonomy of bryophytes, pteridophytes, and gymnosperms, emphasizing classification, identification, and nomenclature of regional species of mosses, ferns, and conifers.

356. *Advanced Plant Systematics*. II. 3 HR. PR: BIOL 151 or equiv. Investigation of taxonomic problems and methods of plant classification through readings and herbarium, greenhouse, and laboratory experiences. Approaches include techniques in comparative morphology, anatomy, palynology, cytology, phytochemistry, statistics, and cladistics.

362. *Developmental Biology*. I. 3 HR. PR: BIOL 262 or equiv., organic chemistry or biochemistry, or consent. The molecular and cellular basis of differentiation and morphogenesis. (Offered in fall of odd years.)

364. *Advanced Plant Physiology*. I, II. 3 HR. PR: BIOL 169, organic chemistry, general physics and consent. Advanced studies of plant processes including recent advances in the field. I Second Semester, even numbered years - Mineral nutrition of higher plants. II. First Semester, odd - numbered years -Plant growth and development. III. First Semester, odd -numbered years - Environmental physiology.

375. *Fundamentals of Gerontology*. II. 3 HR. PR: MDS 50 or consent. An advanced multidisciplinary examination of current research in biological, psychological, and sociological issues of human aging and the ways in which these impinge on the individual to create both problems and new opportunities. (Also listed as PSYC 375.)

391. *Advanced Topics*. 1-6 HR.

397. *Research*. 1-15 HR.

490. *Teaching Practicum*. 1-3 HR.

491. *Advanced Study*. 1-6 HR.

492. *Directed Study*. 1-6 HR.

493. *Special Topics*. 1-6 HR.

494. *Special Seminars*. 1-6 HR.

495. *Independent Study*. 1-6 HR.

496. *Graduate Seminar*. 1 HR.

497. *Research*. I, II, S. 1-15 HR.

498. *Thesis*. 2-4 HR.

499. *Graduate Colloquium*. 1-6 HR.

Chemistry

Paul W. Jagodzinski, Chairperson of the Department

222 Clark Hall or 357 Chemistry Research Laboratory

Degrees Offered: Master of Science, Doctor of Philosophy

The Department of Chemistry offers graduate studies leading to the degrees of master of science and doctor of philosophy with research concentration in the areas of analytical, inorganic, organic, physical, and theoretical chemistry. The master of science and doctor of philosophy degrees require completion of a research project, which represents the principal component of the graduate program.

Prerequisites

Applicants for graduate studies in chemistry must have a bachelor's degree as a minimum requirement. Applicants must have a major or concentration in chemistry and an appropriate background in physics and mathematics. All entering graduate students in chemistry are required to take departmental guidance examinations in the major areas of chemistry. These examinations, at the undergraduate level, are administered before registration and serve to guide the faculty in recommending a course program for the beginning graduate student. Deficiencies revealed by the departmental guidance examinations need to be corrected in a manner prescribed by the faculty. All graduate students pursuing M.S. and Ph.D. degrees in chemistry are required to teach in the instructional laboratories for a minimum of two semesters.

Thesis/Credits

The WVU general requirements for the master of science degree are outlined elsewhere in this catalog. Graduate students in the M.S. program in chemistry are required to submit a research thesis. They may apply up to six hours of research credit toward the 30-hour requirement. The remaining 24 hours of credit must be earned in the basic graduate courses which reflect a diversified exposure to chemistry; no more than nine hours of 200-level chemistry courses may be included; no more than 10 hours may be elected outside the department; and course work taken at the 300 to 400-level must include at least three, three credit-hour courses distributed in two of the three areas of chemistry outside the student's major area of research. Students are required to enroll in the departmental seminar program and are expected to attend special lectures and seminars offered by visiting scientists. A final oral examination is administered after completion and submission of the thesis.

Doctor of Philosophy

The program for the degree of doctor of philosophy reflects a flexible, research-oriented approach geared to develop the interests, capability, and potential of students. A program of courses is recommended to suit individual needs based on background and ability. These courses are classified as basic graduate courses which present the essentials of a given discipline on an advanced level, and specialized graduate courses that take one to the frontiers in a specific area of research. The course offerings are designed to provide guidelines from which students can launch their independent studies in preparation for candidacy examinations. Students are required to enroll in the departmental seminar program and are expected to attend special lectures and seminars offered by visiting scientists.

Graduate students in the Ph.D. program are required to complete satisfactorily a minimum of three courses (three credits each) at the 300-400 course level, offered by the Department of Chemistry and distributed in two areas outside their major area of research. In addition, each major area in chemistry requires students in that area to enroll in basic graduate courses presenting the essentials of that discipline on an advanced level.

Candidacy Candidacy examinations contain written and oral portions. The written examinations are of the cumulative type, and are offered eight times a year. The oral examination is based on a proposition for a research problem not intimately related to the student's own project, or any particular research project being actively pursued at WVU. This proposition is presented in writing to the student's research committee and defended before that group and any other interested faculty members.

Research

Research, which is the major theme of graduate studies, may be initiated as early as the student and faculty feel appropriate for the individual. Normally, a student will begin laboratory work no later than the second semester. Upon successful completion of an original piece of research, the candidate will present results in a Ph.D. dissertation and at the appropriate time defend the work in a final oral examination.

Chemistry (CHEM)

201. *Chemical Literature*. I. 1 HR. PR: CHEM 134 and CHEM 141 or 246. Study of techniques for locating, utilizing, and compiling information needed by the research worker in chemistry. 1 HR. lec.

202. *Selected Topics*. I, II. 1-3 HR. PR: Written consent and 2.0 CHEM GPA. Individual instruction under supervision of a faculty member.

203. *Undergraduate Seminar*. II. 1 HR. PR: CHEM 201. For B.S. chemistry majors, B.A. chemistry majors by consent. Instruction in design and presentation of topics of current chemical interest. 1 HR. individual instruction and/or lecture.

210. *Instrumental Analysis*. II. 3 HR. PR: CHEM 115 and Physical Chemistry lectures and demonstrations. Fundamentals of instrumental methods applies to chemical analyses: electrochemistry, spectroscopy, mass spectrometry, and chromatography. 2 HR. lec.; 1 HR. demonstration.

211. *Intermediate Analytical Chemistry*. I. 3 HR. PR: CHEM 115 and physical chemistry. Concepts underlying modern analytical procedures and their application to the solution of contemporary problems; presented at the intermediate level. 3 HR. lec.

212. *Environmental Chemistry*. II. 3 HR. PR: CHEM 115, 134, and physical chemistry. Study of the nature, reactions, transport, and fates of chemical species in the environment. 2 HR. lec.; 1 HR. demonstration.

213. *Instrumental Analysis Laboratory*. I. 3 HR. PR: CHEM 210. Practical application of modern instrumental methods to problems in chemical analysis. 3 HR. lab.

214. *Computer Methods in Analytical Chemistry*. I. 1 HR. PR: CHEM 210; Conc: CHEM 213. Instruction in the use of data acquisition and data processing systems in the analytical chemistry lab. 3 HR. lab.

222. *Intermediate Inorganic Chemistry*. I. 3 HR. PR: Physical chemistry. Structure, bonding, and reactivity of compounds of main-group and transition metal elements. Molecular structure and symmetry, solid state chemistry, ligand field theory, and coordination chemistry. 3 HR. lec.

223. *Inorganic Synthesis Laboratory*. II. 2 HR. PR: CHEM 222. Application of modern synthetic and spectroscopic methods of analysis to the preparation and characterization of main group, solid-state, transition metal, and organometallic compounds. Two 3 HR. lab.

235. *Methods of Structure Determination*. I. 4 HR. PR: CHEM 134 and CHEM 136. Use of chemical methods and UV, IR, NMR, and mass spectroscopy to elucidate structures of organic compounds. For students in chemistry and related fields who may need these methods in research and applied science. 2 HR. lec., two 3 HR. lab.

237. *Polymer Chemistry*. I. 3 HR. PR: CHEM 134 and physical chemistry. Methods, mechanisms, and underlying theory of polymerization. Structure and stereochemistry of polymers in relation to chemical, physical, and mechanical properties. 3 HR. lec.

239. *Organic Syntheses*. II. 3 HR. PR: CHEM 134, 136. Modern synthetic methods of organic chemistry. 1 HR. lec., two 3 HR. lab.

241. *Chemical Crystallography*. II. 3 HR. PR or Conc.: Physical chemistry or consent. Applications of X-ray diffraction of crystals to the study of crystal and molecular structure. Includes theories of diffraction and crystallographic methods of analysis. 3 HR. lec.

244. *Colloid and Surface Chemistry*. II. 3 HR. PR: Physical chemistry. Selected topics in the properties and physical chemistry of systems involving macromolecules, lyophobic colloids, and surfaces. 3 HR. lec.

246. *Physical Chemistry*. I. 3 HR. PR: CHEM 134, MATH 16, and PHYS 12. A first course in physical chemistry. Topics include a study of thermodynamics and chemical equilibria. 3 HR. lec. (Students may not receive credit for CHEM 246 and for CHEM 141.)

247. *Physical Chemistry Laboratory*. II. 1 HR. PR: CHEM 18 or 115 and CHEM 246. Experimentation illustrating the principles of physical chemistry and offering experience with chemical instrumentation. One 3 HR. lab.

248. *Physical Chemistry*. II. 3 HR. PR: CHEM 246 and MATH 17. Continuation of CHEM 246. Chemical Dynamics and the structure of matter. 3 HR. lec. (Students may not receive credit for CHEM 248 and for CHEM 141.)

249. *Physical Chemistry Laboratory*. I. 2 HR. PR: CHEM 246, 247, 248. Continuation of CHEM 247. Two 3 HR. lab.

250. *Bonding & Molecular Structure*. I. 3 HR. PR: CHEM 248. Introduction to the quantum theory of chemical bonding. Atomic structure, theoretical spectroscopy, predictions of molecular structures, and bond properties. 3 HR. lec.

314. *Mass Spec. Principles and Practice*. II. 3 HR. PR: CHEM 210. Fundamental principles underlying modern mass spectrometry. Gas phase chemistry related to the formation and fragmentation of ions. The design of instrumental systems for mass spectrometry. Application of mass spectrometric techniques to multidisciplinary problems of current interest. 3 HR. lec.

321. *Organometallic Chemistry*. 3 HR. PR: Graduate standing in chemistry or consent. Syntheses, structure, and reactivity of organometallic compounds. Applications of organometallic compounds to catalysis and organic synthesis. 3 HR. lec.

331. *Advanced Organic Chemistry 1*. I. 3 HR. PR: CHEM 134. Structural concepts, bonding, tautomerism, static and dynamic stereochemistry, mechanistic classifications of reagents, and reactions including some applications. 3 HR. lec.

332. *Advanced Organic Chemistry 2*. II. 3 HR. PR: CHEM 331. Continuation of CHEM 331 with emphasis upon synthetic methods and reaction mechanisms. 3 HR. lec.

341. *Chemical Thermodynamics*. 3 HR. PR: CHEM 248. Principles of classical and statistical thermodynamics and their application to chemical problems. 3 HR. lec.

391. *Advanced Topics*. 1-6 HR.

397. *Research*. 1-15 HR.

411. *Seminar in Analytical Chemistry*. I, II. 1 HR. per sem. Current literature and research.

412. *Seminar in Analytical Chemistry*. I, II. 1 HR. per semester. Current literature and research.

413. *Electrochemistry & Instrumentn*. I. 3 HR. PR: CHEM 210. Electronic instrumentation applied to study of mass transfer kinetics of electrode reactions, voltammetry, and high-frequency methods. 3 HR. lec.

414. *Analyt. Atomic Spectrom*. I. 3 HR. PR: CHEM 250. Theory of atomic spectroscopy relevant to elemental analysis Considerations in the design and use of modern optical spectrometry systems. 3 HR. lec.

415. *Chemical Separations*. 3 HR. PR: CHEM 115, 133 and physical chemistry. Fundamentals of separate transport and flow transport processes underlying all separation techniques. Empirical coverage of chromatographic and electrophoretic methods for analytical separations. 3 HR. lec.

417. *Advanced Topics in Analytical Chemistry*. I, II. 1 - 3 HR. per sem. Recent advances and topics of current interest. lec./discussion.

421. *Seminar in Inorganic Chemistry*. I, II. 1 HR. per sem. Current literature and research.
422. *Seminar in Inorganic Chemistry*. I, II. 1 HR. per sem. Current literature and research.
423. *Phys. Methods in Inorganic Chemistry*. I. 3 HR. PR: CHEM 222. Symmetry, vibrational spectroscopy, theory and applications of NMR and EPR methods, magnetism, optical activity, dynamic processes, and fluxional behavior. 3 HR. lec
424. *Coordination Chemistry*. II. 3 HR. PR: CHEM 222. Symmetry, hybridization, ligand field theory, molecular orbital theory, metal-ligand bonding in coordination complexes and organometallics. 3 HR. lec.
425. *Inorganic Reactions and Mechanisms*. I. 3 HR. PR: CHEM 222. Inorganic reactions (ligand substitution aquation, organometallic reactions, electron transfer); kinetics and mechanistic studies. 3 HR. lec.
427. *Advanced Topics in Inorganic Chemistry*. I, II. 1-3 HR. per sem. Recent advances and topics of current interest. lec./discussion.
428. *Advanced Topics in Inorganic Chemistry*. I, II. 1-3 HR. per sem. Recent advances and topics of current interest. lec./discussion.
431. *Seminar in Organic Chemistry*. I, II. 1 HR. per sem. Current literature and research.
432. *Seminar in Organic Chemistry*. I, II. 1 HR. per sem. Current literature and research.
433. *Physical Organic Chemistry*. II. 3 HR. PR: Chem 331. Theoretical considerations of organic molecules, kinetics and other methods used in the study of organic structure and reaction mechanisms, linear free energy relationship and other related topics. 3 HR. lec.
437. *Advanced Topics in Organic Chemistry*. I, II. 1-3 HR. per sem. Recent advances and topics of current interest.
438. *Advanced Topics in Organic Chemistry*. I, II. 1-3 HR. per sem. Recent advances and topics of current interest.
441. *Seminar in Physical Chemistry*. I, II. 1 HR. per sem. Current literature and research.
442. *Seminar in Physical Chemistry*. I, II. 1 HR. per sem. Current literature and research.
443. *Chemical Kinetics*. I. 3 HR. PR: CHEM 248. Theories and applications of kinetics in gaseous state and in solution. 3 HR. lec.
444. *Statistical Mechanics*. I or II. 3 HR. PR: CHEM 446. Theory and application of statistical mechanics to chemical systems. 3 HR. lec. (Offered on demand.)
445. *Theoretical Chemistry 1*. I or II. 3 HR. PR: Differential equations. Theoretical background for quantum mechanics. 3 HR. lec.
446. *Theoretical Chemistry 2*. I or II. 3 HR. PR: CHEM 445. Theories and applications of quantum mechanics in chemistry. 3 HR. lec. (Offered on demand.)
447. *Molecular Spectrosc. & Structure*. II. 3 HR. PR: CHEM 250 or graduate standing in chemistry, or consent. Advanced applications of spectral methods to the study of molecular structure. 3 HR. lec.
448. *Advanced Topics in Physical Chemistry*. I, II. 1-3 HR. per sem. Recent advances and topics of current interest.
449. *Advanced Topics in Physical Chemistry*. I, II. 1-3 HR. per sem. Recent advances and topics of current interest.
489. *Research Seminar*. I, II. 1 HR. PR: Graduate student in chemistry. Research seminars by visiting lecturers.
490. *Teaching Practicum*. 1-3 HR.

491. *Advanced Study*. I, II, S. 1-6 HR. PR: Consent. Investigation in advanced subjects which are not covered in regularly scheduled courses. Study may be independent or through specially scheduled lectures.

492. *Directed Study*. I, II. 1-6 HR.

493. *Special Topics*. 1-6 HR.

494. *Special Seminars*. 1-6 HR.

495. *Independent Study*. 1-6 HR.

496. *Graduate Seminar*. 1 HR.

497. *Research*. I, II, S. 1-15 HR.

498. *Thesis*. 2-4 HR.

499. *Graduate Colloquium*. I, II, S. 1-6 HR. PR: Consent. For graduate students not seeking course work credit but who wish to meet residence requirements, use the University's facilities, and participate in academic and cultural programs.

Communication Studies

Melanie Booth-Butterfield, Chairperson of the Department

108 Armstrong Hall

Degree Offered: Master of Arts

The Department of Communication Studies offers work leading to the degree of Master of Arts, with a concentration in communication theory and research. Persons who possess a bachelor's degree from an accredited college or university may be admitted to the program. Qualified graduate students from a variety of disciplines are admitted to the program. The master of arts degree program is intended to qualify the student to:

- Assume a variety of professional roles in educational, industrial, governmental, or media institutions.
- Teach the subject matter in high school and/or college.
- Undertake advanced training toward a doctorate in the behavioral/social sciences.

Requirements

In addition to the general WVU requirements, the graduate student in communication studies must meet departmental requirements. These include successful completion of the minimum number of required graduate hours as set forth in Program A, B, or C, below with a grade of B or above in each class and the maintenance of a minimum grade-point average of 3.0.

Classes graded "P", "S" or marked "CR" may not be counted toward a degree.

Program A

Applicants for admission must specify the program they wish to pursue. Program A is open only to full-time resident students. Programs B and C are open to both part-time and full-time students.

All students planning to continue graduate study past the M.A. level are encouraged to enter Program A. The following are required:

- At least 36 hours of graduate credit, 30 of which must be in the Department of Communication Studies. A maximum of six hours of thesis credit will be allowed.
- Completion of COMM 401 and 420.
- A thesis.
- An oral examination on the thesis.

Program B

All students planning a professional career in a field other than education are encouraged to enter this program. This is normally a terminal degree program in communication studies. The following are required:

- A minimum of 36 hours of course work with at least 30 hours in the Department of Communication Studies:
- Successful completion of written and oral comprehensive examinations.

The oral examination may be waived with the approval of the student's examination committee and the departmental coordinator of graduate studies.

Students who wish to prepare themselves to be more effective professional communicators but who may not wish to complete program B may obtain a certificate in corporate and organizational communication by completing 15 specified hours in this program. Three courses are required: COMM 491-A *Applied Communication Theory*, COMM 491-B *Nonverbal Communication in the Organizational Environment*, and COMM 376 *Theory and Research in Organizational Communication*. Six hours of electives may be chosen from COMM 370, 373, 374, and 377.

Program C

All students planning a professional career in elementary or secondary education are encouraged to enter this program. This is normally a terminal degree program in communication studies. Students may complete this program through off-campus study, on-campus study, or a combination. The following are required:

- A minimum of 33 hours of course work with at least 27 hours in the Department of Communication Studies including COMM 361, 362, 363, and 378.
- Successful completion of written and oral comprehensive examinations.

The oral examination may be waived with the approval of the student's examination committee and the departmental coordinator of graduate studies.

Communication Studies (COMM)

201. *Principles of Communication Education*. I, II. 3 HR. PR: 15 hr communication studies. Literature, principles, and current practices of communication education in public schools with directed application. Intended for teachers in communication and language arts.

206. *Advanced Study in Nonverbal Communication*. I, II. 3 HR. PR: COMM 106. Functions of nonverbal communication including status, power, immediacy, relationship development, regulation, turn-taking, leakage and deception, tuition, person perception, and emotional expressions.

221. *Persuasion*. I, II. 3 HR. Theory and research in persuasion, emphasizing a critical understanding and working knowledge of the effects of social communication on attitudes, beliefs, and behavior.

230. *Survey of Rhetorical-Communication Theory*. I, II. 3 HR. A survey of theory in the rhetorical communication context with emphasis upon periods preceding the twentieth century.

231. *Communication and Symbol Analysis*. I, II, 3 HR. PR: COMM 131. Advanced study of language in communication. Specific attention to conversational analysis.
361. *Communication in the Classroom*. I, II, S. 3 HR. PR: Teaching experience or consent. Role of interpersonal communication in classroom environment, with particular emphasis on communication between students and teachers. Recommended for elementary, secondary, and college teachers in all fields.
362. *Nonverbal Communication in the Classroom*. I, II, S. 3 HR. Impact of nonverbal communication behaviors of students and teachers on teacher-student interaction and student learning. Recommended for elementary, secondary, and college teachers in all fields.
363. *Communication in the Educational Organization*. I, II, S. 3 HR. Problems of communication within educational organizations with emphasis on elements that impact educational change, conflict management, and interpersonal influence. Recommended for elementary, secondary, and college teachers in all fields.
364. *Communication Problems of Children*. I, II, S. 3 Hr (Primarily for elementary and secondary school teachers and language arts supervisors.) Normal maturational development of listening and speaking skills, their relationships to language acquisition, and influence upon achievement.
365. *Media in Communication and Education*. I, II, S. 3 HR. Use of the media in educational and other communication environments with emphasis on communication processes and principles relevant to television and film.
370. *Interpersonal Communication: Theory and Research*. I, II, S. 3 HR. Survey of the theory and research in dyadic interpersonal communication. Emphasis upon relational communication and intimate communication in interpersonal relationships.
371. *Theory and Research in Language*. 3 HR. Study of verbal interactions and language from source and receive perspectives.
372. *Theory and Research in Mass Communication*. I, II, 3 HR. Mass communication from a consumer's viewpoint. Use of consumer-oriented mass media research also stressed.
373. *Theory and Research in Persuasion*. I, II, S. 3 HR. Various theories and principles of persuasion with emphasis on contemporary research literature.
374. *Intercultural Communication: Theory and Research*. 3 HR. Advanced seminar in communication of various cultures. Special emphasis on research in diffusion of innovations.
375. *Communication Apprehension and Avoidance*. 3 HR. Theory and research related to individuals' predispositional and situational tendencies to approach or avoid communication. Emphasis on work in the areas of willingness to communicate, communication apprehension, reticence, and shyness.
376. *Theory and Research in Organizational Communication*. I, II, 3 HR. Contemporary research linking communication variables and networks to organizational change, effectiveness, leadership, power, and management practices. Analysis of communication problems within a variety of organizations.
377. *Small Group Theory and Practice*. I, II, S. 3 HR. Specific research areas in interpersonal communication with emphasis on small groups.
378. *Comm and Affect in Instruction*. II, 3 HR. PR: Graduate Status. This advanced graduate course addresses how communication of affect from the perspective of both instructor and students influences of classroom learning.
391. *Advanced Topics*. 1-6 HR. PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.
397. *Research*. 1-15 HR. PR: Consent. Research activities leading to a thesis, problem report, research paper, or equivalent scholarly project.

401. *Introduction to Graduate Study in Human Communication*. I. 3 HR. Major emphasis on designing and conducting experimental and laboratory research in human communication. Computer applications to social science research also given consideration. Should be taken the first semester of graduate study.

402. *Advanced Seminar in Research Methods*. II. 3 HR. PR: COMM 401. Research techniques necessary to conduct original communication research. Emphasis on advanced statistical techniques.

420. *Survey of Human Communication Theory*. I. 3 HR. Broad overview of contemporary theories in human communication. Should be taken the first semester of graduate study.

433. *Special Topics*. I, II, S. 3-12 HR. PR: Consent. Thorough study of special topics in human communication including interpersonal and small group, language, intercultural, organizational, persuasion, and mass communication, nonverbal communication, and communication education.

475. *Independent Study*. I, II, S. 1-3 HR. PR: Consent. Open to graduate students pursuing independent study in communication.

486. *Seminar in Human Communication*. I, II, S. 3-9 HR. Current problems and research in human communication.

490. *Teaching Practicum*. I, II. 1-3 HR. PR: Consent. (Open only to graduate assistants in the Department of Communication Studies.) Supervised experience in classroom teaching.

491. *Advanced Study*. I, II, S. 1-6 HR. Advanced study in a variety of areas in human communication.

492. *Directed Study*. 1-6 HR. Directed study, reading, and/or research.

493. *Special Topics*. 1-6 HR. A study of contemporary topics selected from recent developments in the field.

493A. *Special Topics*. 1-6 HR. A study of contemporary topics selected from recent developments in the field.

494. *Special Seminars*. 1-6 HR. Special seminars arranged for advanced graduate students.

495. *Independent Study*. 1-6 HR.

496. *Graduate Seminar*. 1 HR.

497. *Research*. I, II, S. 1-15 HR.

498. *Thesis*. 2-4 HR.

499. *Graduate Colloquium*. 1-6 HR.

English

Patrick W. Conner, Ph.D., Chairperson of the Department

Timothy Sweet, Ph.D. Supervisor

Elaine Ginsberg, M.A. Supervisor

Stansbury Hall

Degrees Offered: Master of Arts, Doctor of Philosophy

To be admitted to the Department of English as prospective candidates for the degree of Master of Arts, students are expected to have completed work comparable to the department's undergraduate requirement for English majors (but with records distinctly above the average), and to present as part of their applications their scores on the Graduate Record Examination General Aptitude Test, and, if nonnative speakers of English, their TOEFL scores. Past experience has shown that successful graduate students usually score at least the 60th percentile on the verbal section of the GRE.

Master of Arts

Admission The applicant may be admitted as a regular graduate student—one who is approved for a degree program; more rarely as a provisional graduate student—one who is accepted for study but at the time of acceptance does not meet all the requirements for regular admission; or as a non-degree graduate student. (The GRE and TOEFL scores are not required of non-degree graduate students.)

Course Requirements (No Thesis) M.A. students selecting the non-thesis option must successfully complete 30 hours, distributed as follows: nine hours of core courses; nine hours of author, topic, genre courses; nine hours of seminar courses (including ENGL 492); and three hours of unrestricted course work. No more than six hours of course work outside the Department of English can apply toward the 30-hour requirement. Students should check with the department about the most current courses available.

Course Requirements and Thesis A candidate for the M.A. degree may choose to take 24 hours of course work and write a thesis, for six hours credit, under the supervision of a thesis advisor. The thesis may be creative (a novel or a collection of short stories, poems, or literary essays with an analytic introduction) or scholarly. A candidate may register for up to 12 hours of thesis credit, but only six hours can be included in the 30 hours required for the degree. Thesis hours are graded as S (satisfactory) or U (unsatisfactory).

Students electing the thesis option are expected to defend their finished work before their thesis committees and any others who wish to attend the oral examination. The English Department requires no terminal examination. Instead, course distribution requirements and individual courses provide rigor and breadth, and only classes passed with a grade of B or better count toward the degree.

Language Requirement Two options are available for fulfilling the foreign language requirement. In the first option, students may take a graduate reading examination administered by the Department of Foreign Languages in French, German, classical Greek, Italian, Latin, Russian, or Spanish. In the alternative option, students may fulfill the language requirement by having successfully completed (with receipt of a grade of A or B in the last course) a second-year level of foreign language study at an accredited college or university (or its international equivalent) within the last five years.

Doctor of Philosophy

Admission Applicants for admission to the program will be judged on the bases of academic record, three recommendations from former teachers, a statement of purpose outlining their academic and professional goals, a sample of their academic writing, and the Graduate Record Examination Advanced Test scores. Nonnative English-speaking applicants must also present their TOEFL scores. All decisions on admission are made by the Ph.D. admissions committee.

Examinations and Requirements The doctoral program can be completed in three years of full-time study beyond the master's degree or its equivalent. During the first year in residence, students must enroll in English 499 *Graduate Colloquium*, and pass the qualifying examination. Thirty credit-hours must be taken prior to the examination for formal admission to candidacy. Full-time students are expected to enroll in nine credit-hours per semester. Only 300- and 400-level courses can be applied to the 30 credit-hours requirement; nine of these hours must be in 400-level seminars, one of which must be English 488 *Current Directions in Literary Study*. All doctoral candidates, unless they

have previously taken an equivalent course, must take English 492 *Introduction to Literary Research*. Neither English 490 (required of all teaching assistants) nor English 492 may be substituted for the seminar requirements. Doctoral students must teach successfully in the department. Concurrent with the teaching practicum, six hours of teaching practicum (three for teaching composition and three for teaching literature) are also required. This requirement can be waived for those candidates with teaching experience approved by the department. Students are permitted only six hours of independent study, however. The dissertation carries 12 hours; thus, the typical Ph.D. program includes 48 credit hours.

Upon approval by the plan of study committee, students may choose to complete a minor, not to exceed 12 hours in 300- or 400-level courses, in a related subject offered by another department.

Language Requirement The foreign language options are the same as for the master's program and must be completed prior to taking the examination for formal admission to candidacy.

Doctoral Dissertation After completing course work, passing the examination for formal admission to candidacy, and fulfilling the language and teaching requirements, the student, under the direction of the dissertation committee chairperson, writes a prospectus of the final project. The dissertation, meant to be an original contribution to scholarship in its field, should be able to be completed in one year.

The final examination (oral defense of the dissertation) is scheduled by the dissertation director and is open to the public.

Core Courses

- 301. *The Graduate Writing Workshop*
- 310. *Old English 1*
- 312. *Medieval Literature*
- 313. *Renaissance Literature*
- 314. *Restoration and Eighteenth-Century Literature*
- 315. *Romantic Literature*
- 316. *Victorian Literature*
- 317. *Twentieth-Century British Literature*
- 320. *Studies in Composition and Rhetoric*
- 350. *Shakespeare*
- 370. *American Literature to 1865*
- 371. *American Literature, 1865 to 1915*
- 372. *American Literature, 1915 to Present*
- 383. *Recent Literary Criticism*

Author, Topic, Genre Courses

- 311. *Old English 2*
- 321. *Studies in Drama*
- 322. *Studies in Poetry*
- 323. *Studies in the Novel*
- 324. *Studies in Nonfiction Prose*
- 325. *Study of Selected Authors*
- 392. *Special Topics*

Seminars

- 440. *Seminar in Medieval Studies*
- 446. *Seminar in Renaissance Studies, 1550–1660*
- 460. *Seminar in Restoration and Eighteenth-Century Studies*
- 470. *Seminar in British Romanticism*
- 476. *Seminar in Victorian Studies*
- 484. *Seminar in American Studies*
- 485. *Seminar in Twentieth-Century British Studies*
- 488. *Current Directions in Literary Study*
- 492. *Introduction to Literary Research*
- 493. *Folger Institute Seminar*
- 494. *Seminar*
- 499. *Graduate Colloquium*

English (ENGL)

- 201. *Creative Writing Workshop: Fiction*. I, II. 3 HR. PR: Grade of "B" or higher in ENGL 114. Advanced workshop in creative writing for students seriously engaged in writing fiction.
- 202. *Creative Writing Workshop: Poetry*. I, II. 3 HR. PR: Grade of "B" or higher in ENGL 115. Advanced workshop in creative writing for students seriously engaged in the writing of a major group of poems.
- 203. *Creative Writing Workshop: Non-Fiction*. I, II. 3 HR. PR: Grade of B or better in ENGL 114 or ENGL 115 or ENGL 116. Advanced workshop in creative writing for students seriously engaged in the writing of nonfiction.
- 208. *Scientific and Technical Writing*. I, II. 3 HR. PR: ENGL 1 and 2. Writing for the scientific and technical professions. Description of a process and a complex idea; feasibility report; analysis of a technological innovation; communications; articles for trade and research journals.
- 210. *Structure of the English Language*. I, II. 3 HR. Historical, comparative, and descriptive grammar, together with an introduction to English linguistics.
- 211. *History of the English Language*. I, II. 3 HR. Study of the nature of the language; questions of origins, language families, development, relationships of English as one of the Indo-European languages.
- 220. *American Poetry*. I, II. 3 HR. Major American poets of the nineteenth and twentieth centuries.
- 223. *Modern American Poetics*. I, II. 3 HR. A close study of those poets who have shaped the aesthetics of contemporary American poetry.
- 232. *Literary Criticism*. I, II. 3 HR. Literary criticism from Aristotle to modern times.
- 235. *American Drama*. I, II. 3 HR. Representative American dramas and history of theatre in America.
- 236. *Tragedy*. I, II. 3 HR. Masterpieces of tragedy from Greek times to modern, with consideration of changing concepts of tragedy and of ethical and ideological values reflected in works of major tragic authors.
- 240. *Folk Literature*. I, II. 3 HR. The folk ballad, its origin, history, and literary significance, based on Child's collection and on American ballad collections.
- 241. *Folk Literature of the Southern Appalachian Region*. I, II. 3 HR. Traditional literature of the southern Appalachian region, including songs, prose, tales, languages, customs, based on material collected in the region—especially in West Virginia.
- 245. *Studies in Appalachian Literature*. I, II. S. 3 HR. Studies of authors, genres, themes, or topics in Appalachian literature.

250. *Shakespeare's Art*. I, II, S. (Alt. yrs.) 3 HR. Special studies in Shakespeare's tragedies, comedies, and/or history plays, with some attention given to his non-dramatic poetry. With emphases varying from year to year, studies may include textual, historical, critical, and dramaturgical-theatrical approaches.

255. *Chaucer*. I, II. 3 HR. Early poems, *Troilus and Criseyde*, and *The Canterbury Tales*. In addition to an understanding and appreciation of Chaucer's works, the student is expected to acquire an adequate knowledge of Chaucer's language.

256. *Milton*. I, II. 3 HR. All of Milton's poems and a few selected prose works.

261. *Sixteenth Century Prose and Poetry*. I, II. 3 HR. Studies from Caxton to Bacon, from Skelton to Shakespeare.

262. *Seventeenth Century Prose and Poetry*. I, II. 3 HR. Studies from Donne to Dryden.

263. *Literature of the Eighteenth Century*. I, II. 3 HR. Literature of the period 1660-1744 in relation to social, political, and religious movements of the time.

264. *Literature of the Eighteenth Century*. I, II. 3 HR. Continuation of ENGL 263, covering the latter half of the century. May be taken independently of ENGL 263.

265. *The Romantic Movement*. I, II. 3 HR. A survey of the works of the major British Romantic writers along with an introduction to works of scholarship in British Romanticism.

266. *American Romanticism*. I, II. 3 HR. Writings of Ralph Waldo Emerson, Henry David Thoreau, and Nathaniel Hawthorne. A study of relations of these men to the history of their own time; their contributions to American thought and art.

267. *Victorian Poetry*. I, II. 3 HR. Major Victorian poets-Tennyson, Browning, Arnold, Rossetti, Morris, Swinburne, Fitzgerald-and a few of the later Victorian poets.

268. *British and Irish Poetry From the late 19th Century to the Present*. I, II. 3 HR. Representative poets studied include Yeats, Eliot, Auden, Hughes, Heaney, Hill, and Boland.

271. *Topics in Creative Writing*. II. 3 Hrs. PR: Consent. (May be repeated for a maximum of 9 Hrs.) Advanced work in creative writing; course content changes with genre: fiction, poetry, non-fiction.

273. *Creative Writing Seminar*. I. 3 HR. PR: 9 hours of creative writing and consent. Individual projects in creative writing pursued in a workshop setting.

280. *Southern Writers*. I, II. 3 HR. Twentieth-century Southern essayists, poets, short-story writers and novelist in relation to ideological background.

283. *Study of Selected Authors*. I, II. 3 HR. (May be repeated with a change in course content for a maximum of 9 credit hours.) Study of the works of one or more major authors.

288. *Women writers in England and America*. I, II. 3 HR. Syllabus may vary from year to year to include women writers in a particular country, historical period, or genre; or writing on a particular theme.

290. *Independent Study*. I, II. 1-3 HR. (With departmental consent, may be repeated for a maximum of 9 credit hours.) PR: Departmental consent. Individual study of literary, linguistic, and writing problems.

293. *Practicum in Teaching Composition*. I. 1 HR. Designed to give prospective English and language arts teachers supervised practical experiences in individual writing tutorials.

294. *Fiction for Adolescents*. II. 3 HR. Designed for prospective teachers of English and language arts. Course focuses on recent fiction for adolescents as well as on traditional literature appropriate to the needs, interests, and abilities of youth. Evaluative criteria emphasized.

295. *Approaches to Teaching Composition*. I. 3 HR. PR: ENGL 108. CONC: ENGL 293. (May not be taken for both undergraduate and graduate credit.) Surveys attitudes toward and techniques of teaching writing in elementary and secondary schools. Provides experiment in class with methods of teaching writing.

301. *Graduate Writing Workshop*. I, II. 3 HR. (With departmental consent, may be repeated for a maximum of 6 credit hours.) Advanced workshop in creative writing. Genre and focus varies from semester to semester. PR: Instructor consent.
310. *Old English 1*. I, II. 3 HR. Study of Anglo-Saxon with selected readings from the literature of the period.
311. *Old English 2*. I, II. 3 HR. PR: ENGL 310. Beowulf and other texts in Old English.
312. *Medieval Literature*. 3 HR. Readings in the literature of the Medieval period; attention to major writers and genres; focus on literary theory. 3 HR. lec.
313. *Renaissance Literature*. 3 HR. Readings in the literature of the English Renaissance; attention to major writers and genres; focus on literary history. 3 HR. lec.
314. *Restoration and Eighteenth-Century Literature*. 3 HR. Readings in the literature of England during the Restoration and the eighteenth century; attention to major writers and genres; focus on literary history. 3 HR. lec.
315. *Romantic Literature*. 3 HR. Readings in the literature of England during the romantic period; attention to major writers and genres; focus on literary history. 3 HR. lec.
316. *Victorian Literature*. 3 HR. Readings in the literature of England during the Victorian period; attention to major writers and genres; focus on literary history. 3 HR. lec.
317. *Twentieth-Century British Literature*. 3 HR. Readings on the literature of England during the twentieth century; attention to major writers and genres; focus on literary history. 3 HR. lec.
320. *Studies in Composition and Rhetoric*. 3 HR. Integration of theory with pedagogy for effective instruction, composition and rhetoric. Historical development of composition theory and current issues in rhetoric. 3 HR. lec.
321. *Studies in Drama*. 3 HR. Advanced study in the genre of drama, with emphasis varying from year to year. Course may include textual, historical, critical, formalist, and/or theoretical study. Not restricted to any one period or century.
322. *Studies in Poetry*. 3 HR. Advanced study in genre of poetry, with emphasis varying from year to year. Course may include textual, historical, critical, formalist, and/or theoretical study. Not restricted to any one period or century.
323. *Studies in the Novel*. 3 HR. Advanced study in the genre of the novel, with emphasis varying from year to year. Course may include textual, historical, critical, formalist, and/or theoretical study. Not restricted to any one period or century.
324. *Studies in Nonfiction Prose*. 3 HR. Advanced study in the genre of nonfiction, with emphasis varying from year to year. Course may include textual, historical, critical, formalist, and/or theoretical study. Not restricted to any one period or century.
325. *Study of Selected Authors*. 3 HR. Advanced study of one or more major authors.
350. *Shakespeare*. I, II. 3 HR. Intensive study of selected plays. Special attention to textual problems and to language and poetic imagery, together with the history of Shakespearean criticism and scholarship.
370. *American Literature to 1865*. 3 HR. Readings in the literature of America from its beginnings to 1865; attention to major writers and genres; focus on literary history.
371. *American Literature, 1865-1915*. 3 HR. Readings in the literature of America from 1865-1915; attention to major writers and genres; focus on literary history.
372. *American Literature, 1915-Present*. 3 HR. Readings in the literature of America from 1915 to the present; attention to major writers and genres; focus on literary history.
383. *Recent Literary Criticism*. 3 HR. Brief survey of theories of major schools of recent criticism and an application of these theories to selected literary works.

391. *Advanced Topics*. 1-6 HR.
392. *Special Topics*. I, II, S. 1-9 HR. Advanced study of special topics in language, literature, or writing.
397. *Research*. 1-15 HR.
400. *Thesis*. I, II. 3 HR.
401. *Thesis*. I, II. 3 HR.
440. *Seminar in Medieval Studies*. I, II. 3 HR. Topics from English literature, 1100-1500.
446. *Seminar in Renaissance Studies, 1550-1660*. I, II. 3 HR. Studies in major authors and special topics in the Renaissance.
460. *Seminar in Restoration and Eighteenth-Century Studies*. I, II. 3 HR.
470. *Seminar in British Romanticism*. I, II. 3 HR. Studies in major authors and special topics in the field of British Romanticism.
476. *Seminar in Victorian Studies*. I, II. 3 HR. Research and discussion in selected topics in the literature and history of the period.
484. *Seminar in American Studies*. I, II. 3 HR. Seminar in principal authors and movements in American literature.
485. *Seminar in Twentieth-Century British Studies*. I, II. 3 HR. Seminar in principal authors and movements in twentieth-century British literature.
488. *Current Directions in Literary Study*. II. 3 HR. PR: Advanced graduate standing (English 383 recommended). Intensive study of one or more current approaches to literature and theories of criticism, with some emphasis on the interrelations of literary study with other disciplines.
490. *Teaching Practicum*. I, II. 1-3 HR. Supervised practice in college teaching of expository writing. II-Supervised practice in college teaching of literature.
491. *Advanced Study*. I, II. 1-6 HR. Specific topics approved by the instructor.
492. *Introduction to Literary Research*. I, II. 1-6 HR. Bibliography; materials and tools of literary investigations; methods of research in various fields of literary history and interpretation; problem of editing. Practical guidance in the writing of theses.
493. *Special Topics*. I, II. 1-6 HR. PR: Graduate standing. (Enrollment is by special application only. Contact department chairperson for information.) Seminar conducted by distinguished scholars and held at the Folger Institute of Renaissance and Eighteenth Century Studies in Washington, D.C. Topics vary. (Also listed as HIST 493.)
494. *Special Seminar*. I, II. 1-6 HR. Specific authors to be approved by instructors.
495. *Independent Study*. 1-6 HR.
496. *Graduate Seminar*. 1 HR.
497. *Research*. I, II. 1-15 HR. PR: Consent.
498. *Doctoral Thesis*. I, II. 2-4 HR. PR: Consent.
499. *Graduate Colloquium*. I, II. 1-6 HR. PR: Consent. Credit for this course may not be applied toward satisfaction of the 30-hour degree requirements at either the master's or doctoral level.

Foreign Languages

Frank W. Medley, Jr., Chairperson of the Department

205-B Chitwood Hall

Jeffrey Bruner, Graduate Coordinator

216 Chitwood Hall

Degree Offered: Master of Arts

The Department of Foreign Languages offers the degree of Master of Arts with emphasis in the following areas: French, German, Spanish, TESOL, Linguistics, and Comparative Literature. The degree is intended for those students who seek more specialized knowledge in order to teach in their chosen area, and it serves as the basis for doctoral study. The graduate program in Foreign Languages seeks to prepare students for both options by offering courses in language teaching methodology and applied linguistics as well as in theoretical linguistics, literary criticism, and literature and culture. Students also have opportunity to engage in research projects that reflect their interests within a given subject and which serve to complement and augment the information imparted through in-class activities.

There is a limited number of Graduate Teaching Assistantships (primarily in ESL, French, German, and Spanish, and occasionally in Chinese, Japanese, Linguistics, and Russian) available to help defray the cost of graduate study. The assistantships carry full tuition remission and a nine-month stipend (August-May); there are also opportunities to teach during the university's summer sessions. Assistantships are awarded annually to those students who have potential to become effective teachers.

In addition to graduate teaching assistantships, limited financial aid is available to graduate students in the Department on a competitive basis. For information on stipends, contact the Department chair. A limited number of meritorious tuition waiver awards are sometimes available from the Eberly College of Arts and Sciences through the Department of Foreign Languages; these awards are based on academic performance and financial need. (Recipients of tuition awards who will be enrolling for fewer hours than those paid for in their award must notify the Department immediately. Failure to do so will result in disqualification for future tuition waivers.)

Advisory Committee

To be admitted to the graduate program, a student is expected to have an undergraduate degree in the desired area of study (or an acceptable related area) with a GPA of 3.00 (overall as well as within the major). The student must complete the university admission application, including payment of the required fee, and the departmental application form, which includes a 300-word "statement of purpose."

All international students whose native language is not English must demonstrate proficiency in English by scoring a minimum of 550 on the TOEFL in order to be admitted to the University. **IMPORTANT NOTE:** International students whose native language is not English applying to study TESOL (or a TESOL combination) must score a minimum of 580 on the TOEFL in order to concentrate in that area of study.

The Graduate Record Examination (GRE) is required of all applicants.

To be considered for a Graduate Teaching Assistantship (GTA), the student must complete the GTA Application form and submit a writing sample and a cassette tape, both in the language to which the student is applying. In addition, the student must have three letters of recommendation forwarded by the writers to the Department of Foreign Languages. **NOTE:** Consideration for a GTA is contingent upon admission to the graduate program.

All necessary forms may be obtained from the Department of Foreign Languages. No applications will be processed until the file is complete.

General Academic Information

Advising

All graduate students will have a primary advisor (usually assigned by the chair when the student is accepted into the program). Students should consult with their advisor when they register for, or need to add or drop, courses. In addition, the Graduate Program Coordinator is available to answer questions regarding the degree program, requirements, comprehensive examinations, graduation, etc. Students may consult with the Chairperson regarding departmental matters.

International students

International students studying in the Department on an F-1 visa should remember that they are required to carry a minimum course load of 9 hours each semester (excluding the summer) in order to maintain their legal status for their visa. International students who may be forced to withdraw from a course and thus fall below 9 hours in any semester, must first check with the Department Chair or Associate Chair and also speak with the International Student Office in E. Moore Hall.

Students graduating from the program who wish to receive a Practical Training Visa must apply for it within 60 days before or after graduation. See the International Student Office for necessary application papers and any possible changes in policy.

Academic Requirements

General

A minimum of 36 credit hours at the graduate level, of which 24 hours of course work must be taken within the Department (exclusive of 391— "Advanced Topics" and 397— "Master's Degree Research"). In addition, no more than 12 hours of course work done at the 200 level will be counted toward the degree.

No more than three hours of independent study will be applied to the degree, unless approved by the departmental Chairperson. NOTE: Independent studies will be permitted only in special circumstances; in most instances students must enroll in the regularly scheduled courses.

No courses for the degree may be taken Pass/Fail.

No more than 6 hours of thesis research credits (397) can be applied to the degree.

A 3.00 GPA is required for graduation.

All requirements for the Master's degree must be completed within 8 years of the student's initial matriculation.

Foreign Language Requirement

Students in French, Spanish, or German (that is, those who are not native speakers of the language of study) must demonstrate proficiency in that language by passing the departmental foreign language examination prior to graduation.

Native speakers of English in TESOL, Linguistics, Comparative Literature, or a TESOL combination, must demonstrate proficiency in a second language prior to graduation. This may be done by 1) passing the departmental foreign language exam, or 2) completing four semesters of a foreign language with a minimum GPA of 3.00; in this case, the courses must be taken during the student's course of studies.

Native speakers of English in TESOL or a TESOL combination must take the English Grammar Examination during their first semester; those students who do not pass this examination must complete "The Grammar of English" course (ENGL 392) at their earliest opportunity. (NOTE: This course does not count toward the 36 hours required for graduation.)

International students whose native language is not English are considered to have satisfied the Foreign Language requirement upon admission by virtue of their TOEFL score.

Research Requirement

Students are required to demonstrate their ability to carry out research and to write at a level appropriate to the Master's degree. They may satisfy this requirement in one of the following ways:

Successful completion of Bibliography and Research 365 (3 hrs).

Presentation of an acceptable master's thesis (6 hrs).

Grade of "A" in a 397 course—Master's Degree Research (3 hrs).

Areas of Emphasis

Students must sign a formal "Plan of Study" (available in 205 Chitwood) as soon as possible during their first semester of graduate work. This document lists the requirements within the individual areas of emphasis, and it is the students' responsibility to fulfill these requirements. (A student can change her/his area of emphasis prior to the semester s/he intends to graduate. Please note, however, that teaching assistantships are awarded on the basis of the students' area of emphasis, and a change may affect reappointment.) The specific requirements for each area of emphasis are listed below.

French

Linguistics 247 *Structure of Modern French* **or**

Linguistics 341 *History of the French Language*

French 217 *French Culture* **or**

French 392 *French Civilization*

French 344 *Explication de Textes* **or**

French 326 *Literary Criticism*

Four courses, minimum, in French literature

German

German 211 *German Culture since 1945*

Linguistics 257 *Structure of German* **or**

Linguistics 351 *History of the German Language*

Four courses, minimum, in German literature

Spanish

Linguistics 217 *Structure of Spanish* **or**

Linguistics 311 *History of Spanish*

Spanish 324 *Explicacion de Textos*

Spanish 316 *Spanish Culture* **or**

Spanish 392 *Spanish American Culture*

Four courses, minimum, in Hispanic literature

TESOL

Language 321 *ESL Methods*
Language 341 *ESL Theory*
Linguistics 202 *Phonology*
Linguistics 330 *ESL Linguistics*
ESL 380 *American Culture*

Four courses from the following list:

English 211 *History of the English Language*
English 322 *Studies in Poetry**
English 220 *American Poetry*
English 323 *Studies in the Novel**
English 235 *American Drama*
English 324 *Studies in Nonfiction Prose*
English 245 *Studies in Appalachian Lit.*
English 325 *Studies of Selected Authors**
English 266 *American Romanticism*
English 370 *American Literature to 1865*
English 280 *Southern Writers*
English 371 *American Lit., 1865-1915*
English 292 *Special Topics**
English 372 *American Lit., 1915 to present*
English 294 *Fiction for Adolescents*
English 392 *19th-C. American Literature*
English 321 *Studies in Drama**
English 392 *20th-C. American Literature*

(*If authors are American)

Linguistics

Linguistics 202 *Phonology*
Linguistics 302 *Advanced Phonology*
Linguistics 283 *Transformational Grammar*
Linguistics 383 *Advanced Transformational Syntax*
Two additional courses, minimum, in Linguistics
One culture course

Four additional courses in literature, linguistics, or any combination thereof, beyond the minimum linguistics requirement.

Comparative Literature

Seven courses in literature (of which five must be within the Department)

FLIT 369 *Comparative Literature: Theory and Practice*

One culture course

One of the following:

English 211 *History of English*
Linguistics 313 *Old Spanish*
English 310 *Old English* (Anglo Saxon)
Linguistics 341 *History of French*
English 311 *Old English* (Beowulf)
Linguistics 343 *Old French*
Linguistics 311 *History of Spanish*
Linguistics 351 *History of German*
Linguistics 353 *Middle High German*

Combined areas

Students may also combine two areas, and two of the most common combinations involve TESOL and a second language or linguistics.

The TESOL/Language plan of study must include at least one linguistics course from the TESOL program, one linguistics course in the language, five literature courses (three in one language/two in the other), and a culture course (either American culture or a culture course within the language area).

The TESOL/Linguistics plan of study must include ESL Methods, ESL Theory, ESL Linguistics, Phonology, three additional linguistics courses, American Culture, and four American literature courses. One of the following can substitute for a literature course and may double count as a linguistics requirement: Linguistics 311, Linguistics 313, Linguistics 341, Linguistics 351, Linguistics 353, English 211, English 310, English 311.

Students may petition for a plan of study which is not described above but which falls within the general guidelines and includes at least one linguistics course, one culture course, and four literature courses. The petition must include justification for the combination and a detailed description of the proposed course work. The petition must be submitted to the Graduate Coordinator and approved by the Graduate Coordinator, the Chair, and the Dean.

Information for Graduate Teaching Assistants

The Department values the contributions made by our graduate assistants and strives to help them become effective teachers. All graduate assistants work under the supervision of a coordinator. The coordinator will conduct orientations and organizational meetings with graduate assistants and provide course materials (such as syllabi). In addition, the coordinator will periodically observe individual classes in order to assess the graduate assistants' performance and to provide encouragement and assistance.

Requirements and responsibilities

Graduate assistants normally teach two courses (six class hours per week), although IEP assistants normally teach nine class hours per week. Graduate assistants are uniquely responsible for their courses (including evaluating their students' work).

All graduate assistants must register for a LANG 421 (LANG 321 for TESOL students) during their first semester. In addition, graduate assistants must register for LANG 490 each semester of employment; please note that this course does not count toward the degree.

Students who will be teaching English, French, German, or Spanish must take a test in that language (unless they have previously demonstrated an acceptable level of knowledge of the grammar of the language). If the results are below the acceptable level, they will be required to enroll in an appropriate language course; this course is deemed a deficiency course and does not count toward the degree.

If a graduate student is teaching in a language area different from her/his area of emphasis (and does not hold a master's degree in the language), s/he must register for at least one graduate-level course, per year, in that language.

Students who have already received an M.A. in Foreign Languages from West Virginia University are ineligible for an assistantship in this Department.

The responsibilities of the graduate assistant include:

- Prompt attendance at all required meetings.
- Maintaining full-time student status (minimum 9 hours per semester.)
- At least 6 hours, per semester, must be at the graduate level.
- No more than 3 hours, per semester, may be taken outside the Department without consent.

- Maintaining a minimum grade-point average of 3.00 each semester.

Please remember that the graduate teaching assistantship is a privilege and must be renewed yearly. If a graduate assistant is found to be negligent in any area, his/her assistantship will not be renewed.

Comprehensive Examinations

The comprehensive examinations are intended to evaluate a student's knowledge, including the ability to synthesize and evaluate ideas, in her/his area of emphasis. The examinations are based on standardized reading lists (available in 205 Chitwood). Although some of the works may be covered in course work, independent research will be necessary.

Students must take the comprehensive examinations the semester they intend to graduate. Prior to that, each student must select an examination committee. This committee is comprised of at least three professors from the student's area of emphasis, one of whom will act as the committee chair; the chair must be a regular member of the graduate faculty (see appendix). The student will meet with her/his committee in order to select the content areas of the examinations. The committee is responsible for preparing and grading the student's examination.

The comprehensive examinations will be administered on a Saturday around the 10th week of the semester and is divided into three 2-hour periods. At least two of the sections are to be done in writing. The third section may be written or oral (to be decided in consultation with the committee), and in the latter case the student will schedule an examination time with her/his committee. At least one examination must be written in the language(s) of study (including the TESOL/Language option), and students will be expected to demonstrate appropriate command of the language(s).

If any student fails one written examination, s/he must pass an oral examination on the section failed; if a student who has elected to take two written and one oral examinations should fail the oral, s/he must schedule a make-up examination with the committee. Any student who fails two or more examinations, written or oral, must retake all comprehensive examinations in a later semester.

Thesis

As mentioned above, a student may elect to write a thesis in order to satisfy the research requirement. Under this option, the student is not required to take the written comprehensive examinations but is still responsible for the reading list for her/his area(s). For more information about this option, see the document "Information Regarding Theses" (available in 205 Chitwood).

Graduation

During the semester in which a student plans to graduate, he/she must register for graduation with the Eberly College of Arts and Sciences (103 Woodburn) and fill out an application requesting a Shuttle Sheet from the College (available in 205 Chitwood). The student will then be notified of any deficiencies and will be responsible for correcting them by the appropriate deadlines. The student must also pay graduation fees. **NOTE:** All students must be enrolled for at least one credit hour the semester they intend to graduate.

Bibliography and Research (BIBY)

301. *Introduction to Research*. I. 1-3 HR. (For seminar credit, counts as 1 hour; for a specific project carried out during the course, counts as 3 hours.) PR: Graduate standing. Pro-seminar in graduate-level research in foreign languages, literature, and linguistics.

365. *Methods of Research*. I. 3 HR.

Classics (CLAS)

201. *Roman Novelists*. I. (Alternate years.) 3 HR. PR: CLAS 109, 110, or consent.

202. *Roman Comedy*. II. (Alternate years.) 3 HR. PR: CLAS 109, 110, or consent.

235. *Roman Epic*. I. 3 HR. PR: CLAS 109, 110, or equiv.

292. *Pro-Seminar in Latin or Greek Literature*. 1-6 HR. PR: Consent. Special topics.

392. *Seminar in Latin or Greek Literature*. 1-6 HR. PR: Consent. Special topics.

397. *Master's Degree Research or Thesis*. I, II. 1-15 HR. PR: Consent. Research activities leading to a thesis, problem report, research paper, or equivalent scholarly project.

English as a Second Language

391. *Advanced Topics*. I, II. 1-6 HR. PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

Foreign Literature in Translation (FLIT)

211. *Chinese Literature in Translation*. I. 3 HR. Survey of selected works of Chinese literature from ancient times through the eighteenth century.

221. *Japanese Literature in Translation*. II. 3 HR. Survey of selected works of Japanese literature from ancient period to the mid-nineteenth century and an introduction to a few works of the modern period.

241. *Women Writers of Spain*. 3 HR. Major women writers of Spain from the earliest extant manuscripts to the present; focus on 20th century works. Spanish majors will read selections in the original.

263. *French Women Writers*. 3 HR. Selected works of French women writers. 3 HR. lec.

292. *Pro-Seminar*. I, II, S. 1-6 HR. PR: 6 HR. upper-division literature courses or consent. Special topics.

369. *Comparative Literature: Theory and Practice*. I. 3 HR. PR: Reading fluency in at least one foreign language. Conceptual bases of comparative literature and their application to literary interpretation.

392. *Seminar*. I, II, S. 1-6 HR. PR: 6 HR. of upper-division literature courses or consent. Special topics.

French (FRCH)

203. *Oral Expression*. 3 HR. PR: 6 HR. of upper-division French. Intensive practice of oral skills with emphasis on discussion, debate, recitation, reading aloud, etc.

217. *French Civilization*. II. 3 HR. PR: 12 HR. of French.

221. *The Romantic Movement*. I. 3 HR. PR: 18 HR. of French or consent.

222. *French Realism*. II. 3 HR. PR: 18 HR. of French or consent.

229. *Literature of the Sixteenth Century*. I. 3 HR. PR: 18 HR. of French or consent.

231. *Phonetics and Pronunciation*. II. 3 HR. PR: 12 HR. of French or equiv.

232. *Literature of the Eighteenth Century*. 3 HR. PR: 18 hrs. of French or consent. Survey of major literary works of eighteenth century France.

292. *Pro-Seminar*. I, II, S. 1-6 HR. PR: 18 HR. of French or consent. Special topics.

305. *Fundamentals for Reading French*. I. 3 HR. PR: Graduate or upper-division standing. (FRCH 305 and 306 is intended for graduate students from other departments to teach them to read general and technical French.)

306. *Reading French*. II. 3 HR. PR: 12 HR. of French or equivalent or FRCH 305. (Graduate students meet a doctoral foreign language requirement by achieving a grade of B or better in this course.)

326. *Literary Criticism*. II. 3 HR. PR: B.A. in French or consent.

337. *Moliere*. II. 3 HR. PR: B.A. in French or consent.

344. *Explication de Textes*. II. 3 HR. PR: 24 HR. of French or equivalent.

371. *The Modern Novel to 1930*. I. 3 HR. PR: B.A. in French or consent.

372. *The Novel After 1930*. II. 3 HR. PR: B.A. in French or consent.

374. *French Women Writers*. 3 HR. PR: B.A. in French or consent. Selected works of French women writers.

381. *Medieval French Literature*. II. 3 HR. PR: LING 342 or consent.

391. *Advanced Topics*. I, II. 1-6 HR. PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

392. *Seminar*. 1-6 HR. PR: Consent. Special topics.

397. *Master's Degree Research or Thesis*. I, II. 1-15 hr PR: Consent. Research activities leading to a thesis, problem report, research paper, or equivalent scholarly project.

German (GER)

245. *Classicism and Romanticism*. I. 3 HR. PR: 18 HR. of German or consent. Critical study of German literature from 1750 to 1830.

246. *The Liberal Age*. II. 3 HR. PR: 18 HR. of German or consent. Critical study of German literature from 1830 to 1870.

247. *The Age of Crisis*. I. 3 HR. PR: 18 HR. of German or consent. A critical study of German literature from 1870 to 1945.

292. *Pro-Seminar*. 1-6 HR. PR: Consent. Special topics.

305. *Fundamentals for Reading German*. I. 3 HR. PR: Graduate or upper-division standing. (GER 305-306 is intended for graduate students from other departments to teach them to read general and technical German.)

306. *Reading German*. II. 3 HR. PR: 12 HR. of German or equivalent or GER 305. (Graduate students may meet a doctoral foreign language requirement by achieving a grade of B or better in this course.)

376. *The German Novel*. 3 HR. A study of representative novels from various periods.

391. *Advanced Topics*. I, II. 1-6 HR. PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

392. *Seminar*. 1-6 HR. PR: Graduate standing or consent. Special topics.

397. *Master's Degree Research or Thesis*. I, II. 1-15 HR. PR: Consent. Research activities leading to a thesis, problem report, research paper, or equivalent scholarly project.

Language Teaching Methods (LANG)

221. *The Teaching of Foreign Languages*. I. 3 HR. PR: Consent. Required of all students who are prospective foreign language teachers on the secondary level.

292. *Pro-Seminar*. I, II, S. 1-6 HR. PR: Consent. Special topics.

321. *ESL Methods*. I, II, S. 3 HR. Theory and practice of teaching English as a second language; techniques and approaches for teaching speaking, listening, reading, and writing skills.

391. *Advanced Topics*. I, II. 1-6 HR. PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

392. *Seminar*. I, II, S. 1-6 HR. PR: Consent. Special topics.

397. *Master's Degree Research or Thesis*. I, II. 1-15 hr PR: Consent. Research activities leading to a thesis, problem report, research paper, or equivalent scholarly project.

421. *Teaching Foreign Language in College*. I, II. 1-6 HR. Methods and techniques of teaching a foreign language at the college level.

490. *Teaching Practicum*. I, II, S. 1-3 HR.

499. *Graduate Colloquium*. I, II, S. 1-6 HR. Required each semester of all graduate assistants in the Department of Foreign Languages.

Linguistics (LING)

202. *Phonology*. I, II. 3 HR. PR: LING 1 or LING 111. Description of sounds and sound systems in language. Articulatory phonetics. Structuralist and generative approaches to phonemics.

217. *Structure of Spanish*. I. 3 HR. PR: 18 HR. of SPAN and LING 111 or consent. Description of the phonological or grammatical systems of Spanish, with emphasis on contrastive analysis (Spanish/English) and applied linguistics.

247. *Structure of Modern French*. I. 3 HR. PR: 18 HR. of FRCH and LING 111 or consent. Study of phonology, morphology, and syntax of modern French together with a contrastive analysis of French and English.

257. *Structure of German*. II. 3 HR. PR: 18 HR. of German and LING 111 or consent. Phonological, morphological and syntactical structure of contemporary German language.

267. *Structure of Russian*. II. 3 HR. PR: 18 HR. of Russian and LING 111 or consent. Phonological, morphological, and syntactical structure of contemporary Russian.

283. *Transformational Grammar*. S. 3 HR. PR: LING 111 and consent. Emphasis on generative syntax in English, German, Romance, and Slavic languages.

284. *History of Linguistics*. I. 3 HR. PR: LING 111 or consent. Development of linguistics from Greeks and Romans to contemporary researchers with concentration on major linguists and schools of the nineteenth and twentieth centuries.

288. *Sociolinguistics*. I. (Alternate years) 3 HR. PR: LING 1 or LING 111. Linguistic study of geographical and social variation in languages; effects of regional background, social class, ethnic group, sex, and setting; outcomes of conflict between dialect and between languages.

292. *Pro-Seminar*. 1-6 HR. PR: Consent. Special topics.

311. *History of the Spanish Language*. II. (Alt. yrs.) 3 HR. PR: 18 HR. of Spanish and LING 111 or consent. Evolution of Castilian from Vulgar Latin to its modern standard form through a study of historical phonology, morphology, and syntax, together with the external factors which influenced the development of the language.

313. *Old Spanish*. II. 3 HR. PR: Consent.

331. *Applied Linguistics*. 3 HR. PR: LING 111 and prior second language study. Study of the application of linguistic analysis in the areas of language acquisition, instruction, and use.

341. *History of the French Language*. II. (Alternate years) 3 HR. PR: 18 HR. of French and LING 111 or consent. Evolution of French from Vulgar Latin into the Modern French standard through a study of historical phonology, morphology, and syntax, together with the external factors which influenced the development of the language.

343. *Old French*. I. 3 HR. PR: Consent. Study of the oldest monuments of the French language including the Chanson de Roland and Aucassin et Nicolette in an effort to trace the evolution of Francien, Anglo-Norman, and Picard and Vulgar Latin.

351. *History of the German Language*. II. (Alternate years) 3 HR. PR: 18 HR. of German and LING 111 or consent. Historical development of standard German languages and dialects.

353. *Middle High German 1*. I. 3 HR. PR: 18 HR. of German and LING 111 or consent. Study of the linguistic developments of Middle High German from the eleventh to the fifteenth centuries with illustrative readings from the Niebelungenlied.

361. *History of the Russian Language*. II. (Alternate years.) 3 HR. PR: 18 HR. of Russian and LING 111 or consent. Development of Russian from Indo-European to the present.

363. *Language Change and Reconstruction*. 3 HR. PR: LING 111 or equivalent. Exploration of the mechanisms of language change, theories of diachronic linguistics, and techniques for reconstructing unattested languages; concentration on the Indo-European family and its history.

383. *Advanced Transformational Syntax*. I. 3 HR. PR: LING 282 or consent. Examination and discussion of theoretical issues in generative-transformational syntax. Focus on specific proposals advanced within the framework of Government-Binding Theory.

387. *Psycholinguistics*. I. 3 HR. PR: LING 111 or consent. Provides an insight into the many areas of psycholinguistics study, including language acquisition, sentence processing, animal communication, dichotic listening, aphasia, and semantics.

391. *Advanced Topics*. I, II. 1-6 HR. PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

392. *Seminar*. 1-6 HR. PR: Consent. Special topics.

397. *Master's Degree Research or Thesis*. I, II. 1-15 HR. PR: Consent. Research activities leading to a thesis, problem report, research paper, or equivalent scholarly project.

Russian (RUSS)

292. *Pro-Seminar*. I, II. 1-6 HR. PR: 18 HR. of Russian or equiv.

Spanish (SPAN)

221. *Golden Age Literature*. II. 3 HR. PR: At least one literature course in Spanish. Readings in Spanish literature of the Renaissance and Baroque periods. in the novel, the comedia, and lyric poetry.

292. *Pro-Seminar*. 1-6 HR. PR: Consent. Special Topics.

315. *Lyric Poetry*. I. 3 HR. PR: 24 HR. of Spanish or equivalent.

324. *Explicacion De Textos*. II. (Alt. yrs.) 3 HR. PR: 24 HR. of Spanish or equivalent.

326. *Cervantes*. II. 3 HR. PR: 24 HR. of Spanish or consent.

391. *Advanced Topics*. I, II. 1-6 HR. PR: Consent. Investigation of advanced topics not covered in regularly scheduled classes.

392. *Seminar*. 1-6 HR. PR: Consent. Special topics.

397. *Master's Degree Research or Thesis*. I, II. 1-15 HR. PR: Consent. Research activities leading to a thesis, problem report, research paper, or equivalent scholarly project.

Geography

Trevor Harris, Chairperson of the Department of Geology and Geography

Ann Oberhauser, Associate Chairperson for Geography

425 White Hall, P.O. Box 6300

**Degrees Offered: Master of Arts, Doctor of Philosophy
with a major in Geography**

The graduate program in geography at West Virginia University provides students with the opportunity to study for a master of arts or a doctor of philosophy degree with an area of emphasis in one or more of the following fields:

- Geographic information systems and remote sensing
- Regional development and planning
- Environmental and resource geography

Research

Students who are interested in pursuing research in an area other than these may do so provided the research area matches the interest of a faculty member in the department who agrees to supervise the student's program. Students who wish to focus their research on a particular region are encouraged to do so. The graduate program in geography at WVU has strong links with the University's Regional Research Institute, the geology program, the Water Research Institute, the international studies program, the West Virginia Geological and Economic Survey, the Center for Women's Studies, and the Center for Black Culture and Research.

Admission/Application Requirements

Master of Arts applicants must submit GRE scores, a personal two-page statement defining the applicant's interest in geography and career intentions, and two letters of recommendation from people who are familiar with the student's undergraduate training. Ph.D. applicants should send three letters of recommendation, GRE scores, and a personal, two-page statement defining the applicant's interest in geography and career intentions. This material should be forwarded directly to the coordinator of the geography graduate program at West Virginia University 425 White Hall, P.O. Box 6300, Morgantown, WV 26506

Prospective students must have an overall undergraduate GPA of 2.75 and a 3.0 GPA for undergraduate geography courses. Students with degrees in other disciplines are encouraged to apply although they may be asked to make up deficiencies in geography during the first year in the program.

Master of Arts

Each incoming student is interviewed prior to the first semester to ascertain the student's interests and to assess whether the student has academic deficiencies. All students are initially supervised by the coordinator of the graduate program until the student develops a more clearly defined research interest. During the early part of the second semester of residence, a first year progress interview will be held with Department of Geography Graduate Studies Committee. The purpose of the meeting is to discuss student progress in the program and to facilitate the process of choosing an M.A. thesis advisor and committee. Two of the three committee members (including the advisor) must be geography faculty members at WVU. Students may change advisor or committee members after consultation with the advisor and the Department of Geography Graduate Studies Committee. In cases where a student is performing significantly below expectations, the progress interview may result in non-continuance in the program.

Course Work A student will be awarded the master of arts degree after completing 30 hours of graduate credit. The student is required to take the following courses: *Geographic Traditions* (GEOG 301), *Geographic Design* (GEOG 302) and four semesters of the *Colloquium* (GEOG 300). The student will also select four elective courses, three of which must be in geography, that provide training in the student's area of specialization.

Thesis The thesis and thesis defense will represent the outcome of independent research undertaken by the student. The thesis must reflect the student's knowledge of the literature relevant and be regarded by the student's program committee as a contribution to the discipline of geography. The student's committee will determine the proposal's acceptability. If it is deemed unacceptable, a further presentation may be required. The proposal must be typed and copied to the committee at least two weeks prior to the presentation. A full proposal of the thesis research will be presented to the faculty in an oral presentation at the end of the second semester or beginning of the third semester. The defense of the thesis will take place when the student and his/her committee agree that a defensible copy of the thesis is complete. The thesis examination is graded on a pass/provisional pass/fail basis by a majority vote of the committee. A student who fails may submit another thesis or a revised version upon the approval of the student's committee. No student may be reexamined more than once. A student who is given a provisional pass will generally be required to make minor revisions or corrections to the thesis. It is expected that full-time students shall not need more than two years to satisfy all program requirements.

Doctor of Philosophy

Prospective doctor of philosophy students must have a master's degree. Students with degrees in other disciplines are encouraged to apply, but they may be asked to make up deficiencies in geography during their first year in the program. Incoming geography students may also be asked to make up deficiencies if any are found during the student's entry interview with faculty. This interview is immediately prior to the first semester of the program.

Students are expected to be well grounded in one of the program's areas of emphasis, and also in the history and philosophy of geography. Students will be awarded a Ph.D. after obtaining 54 hours of graduate credit, completing certain required courses, passing comprehensive examinations, and writing a dissertation. These steps are discussed in more detail below.

Course Work The courses *Geographic Traditions* (GEOG 301) and *Geographic Research Design* (GEOG 302) are required, as well as three general electives and two method electives. An additional 11 hours of other courses, which may include seminars and directed study courses, must also be completed. A limited number of the required courses may be waived if the student has already completed an equivalent course and can demonstrate proficiency with the material.

Examinations and Dissertation The student is required to pass an oral and three written comprehensive examinations. The student will be examined on two areas of specialization and the student's dissertation, research topic. Upon successful completion of the comprehensive examination the student will be expected to defend a dissertation research proposal. The award of the Ph.D. is granted upon the successful defense of the dissertation itself.

Teaching Assistantships

The geography graduate program has available several teaching and research assistantships each year, which are allocated to qualified students on a competitive basis. These awards include a full tuition waiver. Teaching assistantships are awarded annually and for no more than four semesters for M.A. students and six semesters for Ph.D. students. Assistantships are reconfirmed each year based on performance in the previous year with respect to both assistantship duties and academic progress. Additionally, meritorious tuition waivers are offered on a competitive basis to outstanding students who do not receive assistantships. Requests for teaching assistantships and tuition waivers should be sent directly to the coordinator of graduate studies in geography. The deadline for receipt of the latter application is March 15.

Research Assistantships

Research assistantships must be applied for through the faculty member whose research is providing the funding. The geography faculty are engaged in numerous funded research projects, many of which provide graduate students with opportunities for obtaining research skills and experience as well as employment and tuition aid. Furthermore, the professional contacts made in the course of faculty research frequently provide graduate students with opportunities for career development.

Computing Facilities

The geography program's computing facilities are based on an NT local area network. Twelve unix workstations are clustered via Ethernet. The teaching laboratory is based upon INTEL Pentium PCs networked via Ethernet to the cluster and supporting graphic terminal emulation. The system has in excess of nine gigabytes of on-line storage and magnetic tape drives. It supports Tektronix graphic workstations, multiple terminals, four digitizers, a color scanner, and a 36" color electrostatic plotter and a dye sublimation printer. Major hardware upgrades are scheduled.

The computer equipment is housed in recently renovated computer laboratories within the department. The labs represent state-of-the-art computing facilities funded by the NSF and WVU. The laboratory provides hands-on capability for research and teaching as well as computer-based lecture facilities and is among the most sophisticated facilities in the country.

The laboratory operates ESRI's ARC-INFO in both multi-user and workstation environments. TYDAC SPANS raster GIS operating under OS/2 is supported on the personal computers. ERDAS Imagine and GRASS are installed on the workstations. The laboratory has SAS, SAS-Graph, Surface III, Oracle, and extensive database, graphics, spreadsheet, and statistical packages. Dynamic Graphics 3-D EMOD software is currently being installed on a dedicated workstation for GIS applications.

The remote sensing program operates two full-range, portable spectroradiometers, an ASD full range, and a GER MK IV.

Geography (GEOG)

200. *Geographical Data Analysis*. 3 HR. Quantitative techniques for collection, classification, and spatial analysis of geographical data with emphasis on map analysis and application of spatial statistics.

201. *Geography of West Virginia and Appalachia*. 3 HR. PR: GEOG 8 or consent. Geographic analysis of the changing socio-economic activities and physical environment in West Virginia and Appalachia. Emphasis on the historical development of the state and region and contemporary spatial and social inequalities.

202. *Political Geography*. II. 3 HR. Examines the interrelationship between politics and the environment, human territoriality, the political organization of space, geopolitical aspects of the nation-state and international problems.

205. *History of Geography in U.S. Environment*. II. 3 Hr Surveys natural resource exploitation and environmental alteration in the United States from 1600 to the present with consideration of changing natural resource, conservation, and environmental perceptions and policies.

209. *Industrial Geography*. II. 3 HR. PR: GEOG 109 or consent. Introduction to theories and concepts of industrial geography; emphasis on the interdependence of the world economy and spatial patterns of industrial restructuring; case studies from various industrial sectors and regions.

210. *Global Issues: Inequality and Interdependence*. II. (Alternate years.) 3 HR. PR: GEOG 1 or GEOG 2 or GEOG 8. Themes of spatial equity and justice in an increasingly inter-dependent world system. Contemporary issues concerning location, place, movement, and region.

211. *Rural and Regional Development*. 3 HR. PR: GEOG 2 or GEOG 8. An investigation into rural and regional development in developed and underdeveloped regions. The relationship between development theory and policy is explored.

212. *Geography of Gender*. 3 HR. PR: GEOG 8 or consent. An exploration of how gender affects spatial patterns and processes. Theoretical and empirical aspects of feminism are analyzed including women and employment, Third World feminism, sexuality and space, and gender in academia.

215. *Environmental Systems Geography*. II. 3 HR. PR: GEOG 7, equivalent or consent. A geographic analysis of the earth system emphasizing the interdependence and feedback mechanisms of the hydrologic cycle, ecosystems and climate.

219. *Problems in Geography*. I, II. 1-3 HR. PR: Consent. Independent study or special topics.

220. *Seminar in Geography*. I, II. 1-12 HR. per sem.; max. 15 HR. PR: Consent. Includes separate seminars in urban, economic, physical, behavioral, social, Appalachian, transportation, census, planning, resource, international studies, geographic model building, rural problems, cartography, aging, and environment, and energy.

221. *Geomorphology*. II. 3 HR. PR: GEOL 1 and GEOL 2 An examination of earth-surface processes and landforms, with emphasis on environmental geomorphology, streams, floods, glaciers, and landslides. (Required field trip at student's expense; also listed as GEOL 221.)

225. *Urban and Regional Planning*. 3 HR. PR: GEOG 110 or POLS 121 or consent. Explores concepts, techniques, and processes of physical and socioeconomic planning and their application to urban and regional problems.

230. *Land Use Policy*. (Alternate years). 3 HR. PR: GEOG 225 or consent. Basic concepts of land use policy at the national, regional, county, and local level are examined. Environmental and land use policies are analyzed.

250. *Introduction to GIS*. 4 HR. Geographic information systems (GIS) in principle and practice. Spatial data handling in a computer environment: data, analysis, production and information display for planning and decision-making. (3 HR. lec., 1 HR. lab.)

251. *Geographic Information Systems Technical Issues*. (Alternate years.) 3 HR. PR: GEOG 250. Technical aspects of GIS functions, algorithms, theory of geographical data structures and error handling. Labs require tools, data and macros to construct small GIS. (2 HR. lec., 1 HR. lab.)

252. *GIS Applications*. II. 3 HR. PR: GEOG 250. GIS uses, needs, analysis, design, and implementation. Operational institutional and management topics of GIS for planning, locational decision making in business, government, and research contexts. (2 HR. lec., 1 HR. lab.) (Also listed as GEOL 254.)

253. *GIS Design and Implementation*. I, II. S. 3 HR. PR: GEOG 250 and consent. Geographic database design and implementation using contemporary GIS software.

255. *Introduction to Remote Sensing*. I. 3 HR. Theory, technology and applications of photo-interpretation and digital image analysis of aerial photography and multispectral images. (2 HR. lec., 1 HR. lab.) Also listed as GEOL 255.

262. *Digital Cartography*. 3 HR. PR: GEOG 161 or consent. Computer-assisted mapping emphasizing the appropriate uses of software in thematic and topographic map design, annotation, symbolization, color, design, display, and reproduction.

266. *Field Camp*. 3-6 HR. Observations, data gathering, and other field techniques for understanding physical environment, human geography, and culture; off-campus field experience. (3 HR. lec., 3 HR. field camp.)

285. *Methods of Geographic Research*. 3 HR. PR: Consent. Geographic analysis as problem-solving activity. Practical experience in field techniques, library research, hypothesis formation and testing, and report preparation and presentation. Students will acquire skills in literary and numerical approaches to geographic data analysis.

290. *Geographical Perspectives on Energy*. 3 HR. PR: Consent. A survey of the distribution of finite, renewable, and continuous energy resources and an investigation of the geographical patterns of energy consumption and energy flows. The policy implications of an unequal distribution of energy are evaluated.

295. *Internship*. I, II, S. 1-12 HR. PR: Junior standing and consent. A working internship with an agency or company designed to give the student experience in the practical application of geographic training to specific problems.

299. *Honors Thesis*. I, II, S. 3-6 HR. PR: Departmental consent. Thesis proposal, writing, and defense for students admitted to the Honors Program.

300. *Geography Research Colloquium*. I, II. 1 HR. PR: Consent. Lectures and presentation on recent and current research by resident and visiting scholars.

301. *Geographic Traditions*. I. 3 HR. PR: Consent. Review of the major approaches in geographic scholarship.

302. *Geographic Research-Design*. II. 3 HR. PR: GEOG 200 and GEOG 301. Choosing, preparing, and developing research problems of geographic interest. Emphasizes proposal writing and research design alternatives.

309. *Advanced Industrial Geography*. 3 HR. PR: GEOG 209 or consent. Examination of theoretical perspectives and applied research in industrial geography, focus on international industry and employment trends with case studies from developed and underdeveloped regions.

315. *Development Geography*. 3 HR. PR: Consent. An analysis of the concept and practice of development. Alternative people-centered approaches to social change are investigated.

321. *Advanced Fluvial Geomorphology*. I. 4 HR. PR: GEOL 221 or GEOG 221 or consent. Analysis of stream processes, landforms, deposits, including paleohydrology and Appalachian surficial geology. (Fall semester of odd numbered years; required weekend field trips at student's expense; also listed as GEOL 321.)

322. *Surficial and Glacial Geology*. I. 4 HR. PR: GEOL 221 or GEOG 221 or consent. Analysis of late Cenozoic landscapes, especially those caused by glaciers or other-wise influenced by global climate change. (Fall semester of even-numbered years; required weekend field trips at student's expense; also listed as GEOL 322.)

325. *Planning Theory and Process*. (Alternate years.) 3 HR. PR: GEOG 225 or consent. A survey of the historical development of planning theory, the various roles planners play and the ethical dilemmas they face.

329. *Problems in Geomorphology*. I, II. 1-4 HR. (Also listed as GEOL 329.)

351. *GIS Technical Issues*. 3 HR. PR: GEOG 250. Current issues in GIS research. Technical aspects of GIS operations, algorithms, theory of geographical data structures, and error handlings. Labs focus on tools, data structures, database languages, and macros. (2 HR. lec., 1 hr lab.)

391. *Advanced Topics*. 1-6 HR.

397. *Research*. 1-15 HR.

399. *Advanced Research Methods*. 3 HR. PR: GEOG 301 and consent. Review of quantitative and qualitative methods used in geographic research.

411. *Regional Development*. 3 HR. PR: Consent. Review of contemporary geographic theories of uneven spatial development of capitalism.

420. *Resource Geography Seminar*. 3 HR. PR: Consent. Survey of the geographical literature on natural resource management and nature-society theory.

452. *Advanced GIS*. I. 3 HR. PR: GEOG 252 or GEOG 351, or consent. Functional strengths and weaknesses of GIS. Related geographical information science technologies, GPS, remote sensing, multimedia, spatial statistics, and expert systems. Multi-dimensionality (4-D GIS), temporality, social implications of GIS.

455. *Advanced Remote Sensing*. II. 3 HR. PR: GEOG 255, GEOL 255, or consent. Collection, processing and classification of remotely sensed data, including optical, thermal, radar, and topographic information. (2 HR. lec., 1 HR. lab.) (Also listed as GEOL 455.)

489. *Geography Graduate Student Internship*. I, II, S. 1-6 HR. PR: Consent. Internship in the private or public sector designed for practical application of geographic training.

491. *Advanced Study in Geography*. I, II, S. 1-6 HR. Investigation of topics not covered in regularly scheduled courses. Study may be independent or through scheduled meetings.

492. *Directed Study*. 1-6 HR.

493. *Special Topics*. 1-6 HR.

494. *Special Seminars*. 1-6 HR.

495. *Independent Study*. 1-6 HR.

496. *Graduate Seminar*. I, II, S. 1-4 HR. Graduate seminars in geography.

497. *Research in Geography*. I, II, S. 1-15 HR.

498. *Thesis*. 2-4 HR.

499. *Graduate Colloquium*. 1-6 HR.

Geology

Trevor Harris, Chairperson of the Department of Geology and Geography

Thomas Kammer, Associate Chairperson for Geology

425 White Hall

Degrees Offered: Master of Science, Doctor of Philosophy

The graduate program in geology at WVU provides study opportunities in the following areas:

- Hydrogeology and Environmental Geology, with strengths in flow and contaminant-transport modeling, mine reclamation, floods and debris flows, landfill siting, and monitoring;
- Basin Analysis, with strengths in seismic modeling, basin structures, deposystem analysis, sequence stratigraphy, biostratigraphy, diagenesis, and plate tectonics; and
- Energy Geology, with strengths in the exploration and development of oil, gas, and coal.

Admission Procedures and Prerequisites

Applicants for graduate studies in geology must have as a minimum requirement a bachelor's degree and an overall grade-point average of at least 2.75. Acceptance by the Department of Geology and Geography is necessary before admission of any prospective student to the program. All candidates for a graduate degree in geology must submit scores in the general aptitude tests of the Graduate Record Examination. Applicants seeking admission and financial support for the fall semester should apply by February 15. For spring semester, apply by October 1. Write to the department for an application package.

Before being admitted to programs leading to the master of science or the doctor of philosophy, a student must pass an undergraduate review examination covering physical, historical and structural geology, sedimentation-stratigraphy, and mineralogy. The examination is given from 7:00-9:30 p.m. on the third day of classes each semester.

Students seeking admission to the master's program or the Ph.D. program must complete the equivalents of all allied science and mathematics courses required for the B.S. in geology at WVU, plus the following geology courses: Geology 1, 2, 3, 4, 152, 184, 185, 261, and 266. Similar courses from other universities or relevant experiences may be substituted if approved by the departmental graduate curriculum committee. In some cases a requirement may be waived by the committee if the student can pass the undergraduate review examination for that subject area.

GPA Requirements

A minimum grade-point average of 3.0 must be maintained in required formal courses in geology and cognate fields for the master's degree and 3.3 for the Ph.D. Loads of 9-12 hours are required and no withdrawals are permitted after the first two weeks of a semester. A student who fails to maintain the required average at the completion of any semester during the graduate program will be allowed one academic year (two semesters) to attain the required average. Failure to attain this average by the end of the probationary period will permanently eliminate the student as a candidate for a graduate degree in this department.

Master of Science

Emphasis Areas Students are required to take certain courses specified by their advisory committee. Students in the research option must take at least one course in each of three different areas in geology. Students in the Professional Studies option must take at least five courses from a minimum of three different topic areas. The five topic areas, with the relevant courses, are as follows:

- Stratigraphy/Sedimentation/Paleontology: GEOL 332, 341, 346;
- Structure/Tectonics. GEOL 351, 354, 357;
- Petrology. GEOL 385, 394;
- Geophysics/Quantitative Methods/GIS/Remote Sensing. GEOL 252, 352, 353, 399, and GEOG 251, 252, and 355;
- Hydrogeology/Geomorphology. GEOL 321, 322, 362, 364, 365, 395.

Approved graduate courses in biology, chemistry, physics, computer science, mathematics, engineering, soil sciences, or law may be taken as outside courses by geology graduate students. Students are free to take as many courses as they choose outside the department as long as they satisfy the emphasis areas requirements.

No later than the beginning of the second semester in residence, the prospective candidate must choose one of the options leading to the master of science (M.S.) degree in geology.

Research Option This has been the traditional option for the master of science in geology. Students considering continued studies (doctor of philosophy) should choose this option. A minimum of 24 formal course hours or seeking employment in an area of geological research and six research hours are required for graduation. A thesis based on original research also is required. With consent of the candidate's advisory committee, the field work need not be done while in residence at WVU.

Required to graduate: 30 hours, including certain required courses specified by the advisor.

Professional Studies Option This option is designed specifically for students seeking experience in preparing and presenting professional problems. Students choosing this option would be seeking employment in technical fields rather than continuing studies for a higher degree. A minimum of 34 formal-course hours and 8 problems hours (GEOL 392) are required for graduation. The problems hours are in lieu of a thesis and are designed to simulate the work of professional geologists as they seek solutions to open-ended problems. Experience in presentation of problems and solutions is an integral part of the program. Problems credits may be earned in conjunction with off-campus experiences by consent of the candidate's advisory committee. **Required to graduate: 42 hours, including certain required courses specified by the advisor.**

Doctor of Philosophy

Program The candidate for the doctor of philosophy must complete a program of courses outlined by the candidate's doctoral committee. Written and oral comprehensive examinations must be successfully completed. Work on original research is to be presented in a dissertation and defended in an oral examination. Graduate seminar is required.

Cooperative Projects

The National Research Center for Coal and Energy is located on the WVU campus. Research funding for graduate students is obtained by graduate faculty through the NRCCE's National Mine Land Reclamation Center and Water Research Institute. Close cooperation between the West Virginia Geological and Economic Survey, located on Cheat Lake near Morgantown, and the Department of Geology and Geography makes a large amount of material available for laboratory investigation, including the fossil collections of the department and the survey. A large number of samples of drill cuttings from deep wells in West Virginia and adjoining states are housed in the survey. Complete analytical geochemical equipment is available through a University analytical laboratory available to the department. The department also has a number of cooperative projects with the Morgantown Energy Technology Center of the U.S. Department of Energy. Morgantown is conveniently situated for detailed studies of Mississippian, Pennsylvanian, and Permian formations. Mineral products of the region near Morgantown include coal, petroleum, natural gas, and limestone. The occurrence and utilization of these materials can be studied by graduate students interested in economic geology.

Equipment and Facilities

Department geophysical equipment includes a Geometrics magnetometer, a Worden gravimeter, an engineering seismograph, and a three-component short period seismograph. A permanent summer field camp (Camp Wood) is located in the folded Appalachians at Alvon (Greenbrier County), West Virginia, although its basic field course also includes mapping of metamorphic and igneous rocks along the Maine sea coast.

The geology program includes an annual trip to the Florida Keys and glacial geology studies in Maine. Additional oceanography courses and research are available at the Marine Science Consortium at Wallops Island, Virginia, with which WVU is affiliated.

Research and Teaching Computer Resources

The department's computing facilities are centered around an Open VMS Cluster providing a local area network with a fiber optic link to the Internet. The cluster is comprised of three main machines: a VAX 4000, a MicroVAX 3900, and a VaxStation 3500 with attached Sky Warrior array processor. In addition, A VaxStation 3100, and a Dec Alpha 3400 complete the cluster. The cluster contains nine gigs of on-line storage and services printers, plotters, and PCs throughout the department.

A recently renovated computer lab provides seating for 26 people with access to Intel 486/66 and Pentium-based personal computers. Teaching and research facilities offer numerous printers and plotters, including high-speed laser printers, a Tektronix color plotter, Versatec and Benson black and white electrostatic plotters, and a Calcomp electrostatic plotter.

The department is making a transition from an Open VMS cluster to a client server network centered around an AlphaServer 2100 4/200 with 128 megs of RAM, a Dec Alpha 3400 Workstation, an HP Apollo 9000/720 Workstation, and a DecStation 5400. Future modifications to the computing facilities include acquisition of a Windows NT server and a multimedia lab.

Computer Software Resources

The department maintains several software packages that are available for both instructional and research usage. Statistical packages such as SAS, Minitab, and NTSYS allow students to undertake detailed statistical analysis. Surface III, Mapping Contour System, and other mapping software enable users to contour and compare 2D surfaces. Geographic Information System (GIS) software, including ARC-INFO, IDRISI, GRASS, and SPANS, is accessible to students who want to integrate and compare complex geological and geophysical data. ERDAS IMAGINE provides a suite of image processing tools for analyzing remote sensed data. Dynamic Graphics Earth Vision software provides an interactive 3D visualization environment to assist interpretation of multidisciplinary data. AutoCAD and other computer-aided design packages are available to accurately draw surfaces and diagrams.

State-of-the-art geophysical modeling and processing software are also available for instructional and research use. GX Technologies' Advanced Interpretive Modeling System, and Landmark Geophysical's MIRA software help in the analysis of reflection seismic data. Seismic processing capabilities are present in the form of numerous internally developed software in addition to Western Geographical's Sierra Seis, and ICI's Eavesdropper processing software. Interpex Ltd.'s MAGIX package is used to undertake both forward and inverse modeling of gravity and magnetic data. Interpex Ltd.'s RESIXIP and EMIX34 provide forward and inverse modeling capabilities for resistivity and terrain conductivity data.

Software for groundwater modeling falls into several categories. Emphasis is placed on using state-of-practice commercial packages whenever appropriate to enhance career development for both research and professional practice. Supported capabilities include aquifer characterization (AQTESOLV), finite-difference flow codes (MODFLOW), particle-tracking and pathline analysis codes (MODPATH, PATH3D), and solute-transport codes (HFLOW, SOLUTE). Both preprocessors (MODELCAD) and postprocessors (SURFER, Spyglass TRANSFORM) are available for visualization of modeling results. Software in a variety of levels of sophistication are employed so that instruction can be carried out at both undergraduate and advanced levels.

Geology (GEOL)

201. *Physical Geology for Teachers*. I, II. 3 HR. (Credit cannot be obtained for both GEOL 201 and GEOL 1.) PR: High school teaching certificate and consent. Composition and structure of earth and the geological processes which shape its surface.

215. *Environmental Geology*. II. 3 HR. PR or CONC: GEOL 221. Principles, practice, and case histories in application of earth science to environmental problems. Includes: water quality; land-slides; subsidence; waste disposal; legal aspects; and geological aspects of land-use planning. (Field trips and independent field project required.)

221. *Geomorphology*. II. 3 HR. PR: (GEOL 1 and GEOL 2) or (GEOL 10 and GEOL 11) or (GEOG 10 and GEOG 11). An examination of earth-surface processes and landforms, with emphasis on environmental geomorphology, streams, floods, glaciers, and landslides. (Required field trip at student's expense; also listed as GEOG 221.)

231. *Paleontology*. I. 3 HR. PR: GEOL 3 and GEOL 4 and STAT 101. Uses of Paleontologic data in geology; biostratigraphy, paleoecology, evolution, extinction, and biogeography; lab emphasis on identification and utilization of marine invertebrate fossils. (Required weekend field trip at student's expense.)

235. *Introductory Paleobotany*. I. 4 HR. PR: GEOL 3. (Required Saturday field trips at student's expense.) Resume of development of principal plant groups through the ages, present distribution, mode of occurrence and index species, methods of collection.

252. *Environmental and Expl. Geophysics 1*. I. 3 HR. PR: PHYS 2 and (MATH 16 or GEOL 161). Basic theory, computer modeling, and use of gravitational, magnetic, resistivity, and electromagnetic methods in the evaluation of shallow targets of interest to environmental, hydrological, and hazardous waste site investigations.

253. *Structural Geology*. I. 3 HR. PR: GEOL 3 and GEOL 4 and GEOL 184 and GEOL 185 and PHYS 1. Introduction to rock deformation processes and the interpretation of geologic structure, with applications to the structure and tectonic evolution of the Appalachian Mountains. (Several required one-day field trips.)

254. *GIS Applications*. 3 HR. PR: GEOG 200 and GEOG 250. Operational and management issues in planning management analysis, locational decision making, and design implementation of GIS. Lab project emphasizes student's specialization (2 HR. lec., 2 HR. lab; alternate years; also listed as GEOG 252.)

255. *Introduction to Remote Sensing*. I. 3 HR. Theory, technology and applications of photo-interpretation and digital image analysis of aerial photography and multispectral images. (2 HR. lec., 1 HR. lab; also listed as GEOG 255.)

260. *Carbonate Sedimentation of Florida*. S. 2 HR. PR: GEOL 1 and GEOL 2 and consent. Field trip to the Florida Keys to study origin and development of coral reefs and related carbonate sediments. (Transportation, room and board, boat charter, and other misc. costs at student's expense.)

261. *Stratigraphy and Sedimentation*. II. 3 HR. PR: GEOL 3 and GEOL 4 and GEOL 185 and GEOL 221. Study of sediments and sedimentary rocks with an emphasis on the analysis of facies. (Required field trips at student's expense.)

263. *Physical Hydrogeology*. I. 3 HR. PR: GEOL 1 and MATH 3. Principles of ground-water hydrology, emphasizing the physical occurrence and movement of ground water. Topics include aquifer properties, flow net analysis, and hydraulic aquifer testing.

266. *Appalachian Geology Field Camp*. S. 6 HR. PR: GEOL 185 and GEOL 253 and GEOL 261 and consent. Practical experience in detailed geological field procedures and mapping. (Living expense in addition to tuition must be paid at time of registration.)

269. *Applied Hydrogeology Seminar*. I. 1 HR. A review of professional practices and opportunities in hydrogeology. Seminar talks by hydrogeological professionals from WVU, industry, and government agencies. Field trips to examine hydrogeological practices and techniques.

270. *Mineral Resources*. II. 3 HR. PR: GEOL 1 and GEOL 184. Description, mode of occurrence, and principles governing the formation of ore deposits. (Offered in fall of alternate years.)

272. *Petroleum Geology*. II. 3 HR. PR: GEOL 151 or GEOL 253. Origin, geologic distribution, methods of exploration and exploitation, uses and future reserves of petroleum and natural gas in the world. (Offered in spring of odd years.)

273. *Petroleum Geology Laboratory*. II. 1 HR. PR: GEOL 151 or GEOL 253. Well sample description, correlation, and interpretation. Construction and interpretation of subsurface maps used in exploration for hydrocarbons. (Offered in spring of odd years.)

290. *Geologic Problems*. I, II, S. 1-6 HR. (12 HR. max.) PR: Consent. Special problems or field classes for senior and graduate students.

294. *Environmental Geochemistry*. II. 3 HR. PR: GEOL 161 and CHEM 16. Basic review of physical and aqueous chemistry, discussion of basic geochemical processes; calcium carbonate chemistry, diagenetic processes, weathering, the silicate and iron system.

321. *Advanced Fluvial Geomorphology*. I. 4 HR. PR: GEOL 221 or GEOG 221 or consent. Analysis of stream processes, landforms, deposits, including paleohydrology and Appalachian surficial geology. (Fall semester of odd-numbered years; required weekend field trips at student's expense; also listed as GEOG 321.)

322. *Surficial and Glacial Geology*. I. 4 HR. PR: GEOL 221 or GEOG 221 or consent. Analysis of late Cenozoic landscapes, especially those caused by glaciers or otherwise influenced by global climate change. (Fall semester of even-numbered years; required weekend field trips at student's expense; also listed as GEOG 322.)

329. *Problems in Geomorphology*. I, II. 1-4 HR.

332. *Paleoecology*. II. 3 HR. PR: GEOL 231 and GEOL 261 or consent. Methods of paleoecologic analysis in sedimentary geology. Topics include trace fossil analysis, shell biogeochemistry, community paleoecology, biofacies analysis of basins, and Precambrian paleoecology.

340. *Advanced Stratigraphy*. 3 HR.

341. *Carbonate Sedimentology*. I (Alternate years). 4 HR. PR: GEOL 231 and GEOL 261. Origin and distribution of modern marine carbonate sediments as models for interpretation of ancient limestone and dolomite facies.

345. *Stratigraphy of Porous Media*. I. (Alternate years.) 3 HR. PR: GEOL 261. Advanced discussion of the deposition of clastic sediments, chemistry of carbonates, sequence stratigraphy, porosity development in sandstones and limestones, flow of oil through rock.

346. *Advanced Sedimentation*. I. 4 HR. PR: GEOL 261 or consent. (Required field trips at student's expense.) Origin of sedimentary rocks; principles involved in interpretation of ancient geography, climates, animals, and plants. Emphasis on detrital sediments and rocks.

351. *Tectonics*. II. 3 HR. PR: GEOL 152 and GEOL 261; undergraduates need consent. Investigation of patterns and processes of large-scale deformation mechanisms that shape the earth. Focuses on the structural evolution and modeling process of various plate boundaries. Offered in spring of even years.

352. *Environ and Expl Geophysics 2*. I. 4 HR. PR: PHYS 2, and either MATH 16 or GEOL 161, or consent. Studies in applied geophysics with emphasis on the environmental applications of reflection and refraction seismology and ground penetrating radar. (3 HR. lec., 1 HR. computer lab.)

354. *Structural Analysis and Synthesis*. II. 3 HR. PR: GEOL 152 and GEOL 261; undergraduates need consent. Field and literature studies into the development of structures. Emphasizes the use of physical and theoretical models to understand various mechanisms of deformation. Offered in spring of odd years.

357. *Basin Structures*. I. 4 HR. PR: GEOL 152, and GEOL 261, or equivalent. The origin, development, and distribution of basins and the structure found within basins throughout the world are studied. The distribution of energy-related minerals related to basins and structural accumulations is emphasized.

362. *Quantitative Hydrogeology*. II. 3 HR. PR: MATH 16, and GEOL 263 or permission. Mathematical and computer analysis of groundwater flow. Aquifer systems. Radical-flow solutions. Well/aquifer test methods. Superposition, boundaries. Dispersive/advective transport.

364. *Environmental Hydrogeology*. II. 4 HR. PR: GEOL 1 and GEOL 2 and GEOL 263, or consent (PR or Conc: GEOL 362). Seminar reviewing groundwater occurrence, flow, quality, and exploration in various geologic terrains; groundwater pollution and dewatering; and groundwater technology. Includes topical literature review.

365. *Groundwater Modeling*. I. 4 HR. PR: GEOL 362 or consent. Theory and application of groundwater flow modeling, focusing on MODFLOW. Numerical methods. Discretization and boundaries. Parameterization and calibration. Problems and case-histories.

366. *Karst Geology*. I. 3 HR. PR: Consent. Review of karst terrain hydrogeology and geomorphology, emphasizing origins and nature of caves, sinkholes and other karst landforms, environmental problems of karst, and its water and mineral/petroleum resources.

385. *Optical Mineralogy and Petrology*. II. 3 HR. PR: GEOL 185. Introduction to the optical properties of minerals and the use of the petrographic microscope. Interpretation of sedimentary, igneous and metamorphic rocks based on microscopic examination of thin sections. (Offered alternate years.)

391. *Advanced Topics*. 1-6 HR.

392. *Master's Non-Thesis Research*. I, II, S. 1-12 HR. PR: Consent. Supervised non-thesis research for M.S. Option 2. Report required by arranged deadline.

394. *Physical Geochemistry*. I. 3 HR. PR: GEOL 1 and GEOL 185 and CHEM 16. Introduction to thermodynamics and its application to geologic systems. Equilibrium calculations involving pure phases and solutions in gaseous, liquid and solid states. (Offered in fall of even years.)

395. *Aqueous Geochemistry*. II. 3 HR. PR: GEOL 1 and CHEM 12 or CHEM 16, or consent. Review of basic chemical principles as they apply to aqueous geochemical environments. Properties of water and the types, sources, and controls of the common and environmentally significant chemical species dissolved in water.

397. *Research*. I, II, S. 1-15 HR. PR: Consent. Research activities leading to a Master's thesis in Option 1.

399. *Quantitative Methods in Geo-Sciences*. II. 3 HR. PR: STAT 212 or STAT 311, or consent. Brief review and introduction to multivariate quantitative techniques as applied to geology and geography.

420. *Advanced Topics*. 1-12 HR.

455. *Advanced Remote Sensing*. II. 3 HR. PR: GEOG 255 and GEOL 255, or consent. Collection, processing and classification of remotely sensed data, including optical, thermal, radar, and topographic information. (2 HR. lec., 1 HR. lab) (Also listed as GEOG 455.)

491. *Advanced Study*. 1-6 HR.

493. *Special Topics*. 1-6 HR.

494. *Special Seminars*. 1-6 HR.

495. *Independent Study*. 1-6 HR.

496. *Graduate Seminar*. I, II. 1-6 HR.

497. *Research*. I, II, S. 1-15 HR.

499. *Graduate Colloquium*. 1-6 HR.

History

Barbara J. Howe, *Chairperson of the Department*
202 Woodburn Hall

Degrees Offered: Master of Arts, Doctor of Philosophy

The Department of History offers graduate courses in the history of the United States, Appalachia/Regional, Europe, Africa, Asia, Latin America, science and technology, and in public history. Courses are designed to prepare students in historiography, research methods, and interpretation. Students can select concentrations leading to preparation for careers in teaching and scholarship and as specialists for various branches of government, business, and public service. Students in the program are normally expected to pursue the degrees of Master of Arts or Doctor of Philosophy.

Master of Arts

Admission Students seeking admission to the Master of Arts program should have the equivalent of a bachelor's degree in history. Application requirements include transcripts (a minimum of a 3.0 average in history courses is expected), three letters of recommendation, statement of purpose, writing sample, and combined scores of 1500 on the Graduate Record Examination General Aptitude Test.

Requirements This program requires the completion of a minimum of 30 hours of course work with at least a 3.0 average and achievement of proficiency in one foreign language or a research skill (six hours) relevant to the student's program. All 30 hours may be in history, or students may select up to six hours outside of the department. The history course work shall include a well-defined core area (selected from the fields listed for comprehensive examinations or approved by the graduate studies committee) of at least 12 hours, including one readings/research seminar sequence. In addition, students are expected to enroll continuously in HIST 499 *Department Colloquium* for at least two semesters. Credit for this course does not count towards the degree. Students are also required to complete a master's thesis. A maximum of six hours of credit for HIST 397 *Research* can be taken for writing the thesis and for fulfilling the 30-hour M.A. requirement. Candidates for the M.A. are required to pass a final oral examination on their core area of study and thesis.

Public History Program The department also offers a 36-hour M.A. with an emphasis in public history, intended to provide enhanced employment opportunities to graduate students interested in using their education in history in a profession such as historic preservation, contract history work, archives, or historic site administration. The public history program works closely with WVU's Institute for the History of Technology and Industrial Archaeology. This is the only complete public history graduate curriculum in West Virginia.

Students apply for admission as they would for the regular M.A. program and should indicate on their application that they are interested in public history. In addition, students should submit a two-page letter of application, which should indicate the student's background in history or public history and why the student wants to be admitted to the public history program; this letter should be addressed to the director of graduate studies of the Department of History. Students may be admitted to graduate study who do not have an undergraduate major in history by making up deficiencies in their course work for undergraduate credit; these courses may be taken while the students are enrolled for graduate classes, or students may be able to test out of some courses.

The public history emphasis consists of 15 hours of public history courses (introduction to public history, two methods courses, and a six-hour supervised internship). Some courses may be taken outside the Department of History. Public history students are not required to meet the foreign language/research skill requirement. Students are required to take a 300-400 level readings/research seminar sequence in one subject area in the Department of History outside public history. Course descriptions, syllabi, policies and procedures, and a list of internship possibilities are available at the Department of History on request by contacting the coordinator of the public history program.

Doctor of Philosophy

Program Students seeking admission to the Doctor of Philosophy program should have the equivalent of a M.A. in history. Application requirements include a transcript (a minimum of a 3.0 average in graduate history courses is required), three letters of recommendation, and combined scores of 1500 on the Graduate Record Examination General Aptitude Test. Students should also include a statement of purpose and an example of their written work as a part of the application.

Requirements Requirements for the Ph.D. degree in history include the general WVU requirements; achievement of proficiency in one foreign language or research skill with a second language or skill at the discretion of the department; completion of two readings/seminar sequences beyond those offered for the M.A.; continuous enrollment in HIST 499 *Department Colloquium* for all full-time students (part-time students must attend for at least four semesters); passing the Ph.D. comprehensive examination of two parts (oral and written) administered by a committee of faculty members (normally at the end of a full-time student's second year of study); preparation of an acceptable dissertation based on original investigation; and successful defense of the dissertation in a final examination.

Fields of Study A candidate must offer a program of study in four fields, at least three of which must be in history; the other may be in a related field approved by the department. Doctoral students must maintain a 3.0 grade point average to remain in good standing. Fields available in the department include but, are not limited to Europe, United States, Africa, East Asia, Latin America, Appalachia/Regional, and science and technology. At least one field must be in a geographic area outside the major field of concentration for dissertation work.

Dissertation Dissertation work should normally be in United States history, twentieth-century Europe, European social history, Appalachia/regional, science and technology, or modern Africa. Students working in these areas, either at the M.A. or Ph.D. level, have the opportunity to study with adjunct professors and faculty from other departments and universities.

History (HIST)

200. *Greece and Rome*. 3 HR. Covers the Minoan and Mycenaean civilizations, Archaic and Classical Greece. Alexander the Great and the Hellenistic Age, the Roman Republic, the Etruscan and Carthaginian states, and the rise of the Roman Empire.

201. *Social and Economic History of the Middle Ages, 300-1000*. 3 HR. (HIST 103 is recommended as preparation.) The social-economic crisis of the late Roman and German institutions, the Merovingian and Carolingian economies, Pirenne Thesis, and transition to feudal society.

204. *Ancient and Medieval Science*. 3 HR. Investigations of the natural world in classical antiquity and medieval Europe.

205. *The Renaissance*. 3 HR. The underlying political, economic, and social structure of fourteenth- and fifteenth-century Italy with concentration on significant intellectual and cultural trends, including humanism and art, gender roles, state formation and exploration.
206. *The Reformation*. 3 HR. Religious change in sixteenth-century Europe focusing on distinguishing theological characteristics of major reformers, the response of the people to these religious change and the impact on European politics and society.
207. *The Rise of Modern Science*. 3 HR. The emergence of the scientific world view from the Renaissance through the Enlightenment.
208. *Science in Modern Europe*. 3 HR. Crystallization and generalization of scientific world view in Europe after the Scientific Revolution. Emphasizes the mutual interaction of science, society, and culture.
209. *Brazil: Colony to World Power*. 3 HR. Examines the transition of Brazil from a colony to a world power, with special emphasis on recent economic developments, regional diversity, political patterns, foreign affairs, and race relations.
210. *Modern Spain*. 3 HR. Survey of the Moslem, Hapsburg, and Bourbon periods followed by an examination of modern political and social forces, the Civil War, and the rule of Franco.
211. *Industrial Revolution, 1600-1900*. 3 HR. Focuses on technical, economic, and social changes surrounding the Industrial Revolution in England and the United States. Examines also the expanding effects of the process of industrialization in Continental Europe.
212. *Introduction to Public History*. 3 HR. Introduction to a wide range of career possibilities for historians in areas such as archives, historical societies, editing projects, museums, business, libraries, and historic preservation. Lectures, guest speakers, field trips, individual projects.
213. *France-Renaissance to Napoleon*. 3 HR. French history from the end of the Hundred Years War to Napoleon's defeat at Waterloo. Focus on the construction of the modern French state, the Enlightenment, the French Revolution, and Napoleon.
214. *France Since 1815*. 3 HR. French history from the restoration of the Bourbon monarchy to the present. Will emphasize the development of a modern industrial society, the revolutions of the nineteenth century, the impact of the World Wars, and France's role in the new Europe.
215. *European Diplomatic History, 1815 to 1919*. 3 HR. Develops an understanding of the forces, men, and events which determined diplomatic relations between the major powers.
216. *European Diplomatic History, 1919 to Present*. 3 HR. Scope similar to HIST 215.
217. *World War II in Europe*. 3 HR. PR: 6 hrs. History or consent. Impact of World War II on the political culture and moral fabric of European societies; emphasis on themes of invasion, occupation, collaboration, resistance, survival, and retribution.
218. *Eastern Europe Since 1945*. 3 HR. The social, economic, intellectual, cultural, and political history of Eastern Europe since the second World War. Special emphasis on the causes of the East European revolutions of 1989 and the problems of post-communist transition.
219. *Revolutionary Russia, 1905-1939*. 3 HR. Detailed study of the revolutionary era of Russian/Soviet history with emphasis on the origins of Russian radicalism, the upheavals of 1905 and 1917, and Stalin's "revolution from above."
220. *The U.S.S.R., 1939 to Present*. 3 HR. Detailed study of the recent social and political history of the Soviet Union. The Soviet experience in World War II, Stalin's last years, and the conflict between reformism and conservatism since Stalin's death.
221. *Hitler and the Third Reich*. 3 HR. PR: Junior, senior, or graduate standing. Myths and realities of Hitler's public and personal life; emphasis on rise to power, party, ideology, and propaganda techniques; position and policies as fuehrer.
222. *Modern Germany since 1900*. 3 HR. The Weimar Republic, the Third Reich, and the two German states created after World War II.

224. *15th and 16th Century England*. II. 3 HR. England from Richard II to Elizabeth I, covering developments in politics, religion and society, ranging from the War of the Roses to the plague to Protestantism and Shakespeare.
225. *History of Modern China*. 3 HR. Introduction to modern China (since 1839) with attention to China's Confucian heritage; examines in detail the Chinese effort to modernize in the face of Western diplomatic and economic pressure; specific attention to China's Nationalist and Communist revolutionary traditions.
226. *History of Modern Japan*. 3 HR. Modern Japan (since 1868) with attention to the development of Japanese institutions and ideas in earlier periods, especially the Tokugawa Era (1600-1868); examines the rapid pace of economic change in the nineteenth and twentieth centuries along with the important social, political, and diplomatic implications of this change.
227. *East Africa to 1895*. 3 HR. East Africa from earliest times to beginning of European control. Population movement and interaction, development of varying types of polity, revolutionary changes, and the European scramble for East Africa form the major focus.
228. *East Africa Since 1895*. 3 HR. History of colonial rule and movement to independence in East Africa. Political, economic, and social changes will be examined with particular emphasis on the rise and triumph of African nationalism.
229. *History of Africa: Pre-Colonial*. 3 HR. History of Africa from earliest times to the middle of the nineteenth century. Particular emphasis on population movement and interaction, state formation, and the development of trade in sub-Saharan Africa as well as the impact of such external influences as Christianity and Islam.
230. *History of Africa: Colonial*. 3 HR. History of Africa from the middle of the nineteenth century to the 1960's. Political and economic trends will form major focus.
231. *Seventeenth Century Britain, 1603-1715*. 3 HR. The more significant political, social, economic, religious, and intellectual developments of Britain during a century of revolution and of the men and women who interacted with those movements.
232. *Eighteenth Century Britain, 1715-1832*. 3 HR. The Age of Aristocracy, the political, social, religious, economic, and intellectual forces which produced it, and the reasons for its decline under the combined impact of the Industrial, Agricultural, American, and French revolutions.
233. *West Africa to 1885*. I. 3 HR. West Africa from the earliest times to the imposition of colonial rule. Examines social, economic, political developments and interactions, and European scramble for West Africa.
234. *West Africa from 1885*. II. 3 HR. Abolition of the transatlantic slave trade, imposition of colonial rule, colonial economic, social and administrative systems, the rise and triumph of African nationalism, West Africa since independence.
241. *17th century Colonial America*. I. 3 HR. The establishment of England's American colonies and their development during a century of political, social, religious, and economic change and the interaction between events in Old and New Worlds.
242. *18th century America*. II. 3 HR. The social, political, and economic maturation of England's American colonies, the move toward independence, and the establishment of government at state and federal levels.
245. *History of American Women*. 3 HR. Examination of the history of American women from 1607 to the present, with emphasis on working conditions, women's rights, development of feminism, women's role in wartime, and women in the family.
246. *History of European Women to 1700*. 3 HR. History of European women to 1700, emphasizing philosophic, economic, and societal sources of women's oppression, women's self-perceptions and their roles in work, religion, and the family and the development of feminism.
251. *African-American History to 1900*. 3 HR. Slave trade and evolution of slavery in the New World. The attack on slavery and its destruction, the South and the blacks during Reconstruction, and the age of Reaction and Racism, 1875—1900.

252. *African-American History Since 1900*. 3 HR. Reconstruction, the age of reaction and racism, black migration, black nationalism, blacks in the world wars, and desegregation.
253. *Civil War and Reconstruction*. 3 HR. Causes as well as constitutional and diplomatic aspects of the Civil War; the role of the American black in slavery, in war, and in freedom; and the economic and political aspects of Congressional Reconstruction.
255. *Gilded Age in US History*. 3 HR. Examines responses of the American people and institutions to opportunities and problems of the late nineteenth century. Emphasis on rise of big business; labor organization; immigration; regular, reform, and radical politics; disappearance of the frontier; farm crisis; and origins of imperialism.
257. *The United States From McKinley to the New Deal, 1896 To 1933*. 3 HR. American national history from William McKinley to Franklin D. Roosevelt. Particular attention is given to great changes in American life after 1896; national political, economic, social, and cultural development; the Progressive Era in American politics; and alterations in American foreign relations resulting from the Spanish-American War and World War I.
259. *United States History, New Deal to Great Society*. 3 HR. Covers New Deal, World War II; Cold War, with emphasis on American social, political, technological, and cultural developments; United States' domestic problems and foreign relations from 1945 to 1968.
263. *American Diplomacy to 1941*. 3 HR. PR: None. HIST 52 and 53 recommended. American foreign policy and diplomacy from the adoption of the Constitution to America's entry into World War II.
264. *American Diplomacy since 1941*. 3 HR. PR: None, HIST 52 and 53 recommended. America's foreign policy and growing involvement in international relations including the U.S. role in World War II, Korean War, and Vietnam.
265. *The Vietnam War*. II. 3 HR. United States' participation in the 1946-1975 fighting in Indochina. United States' involvement in the political and military conflict, and the impact of the war on the United States.
266. *American Economic History to 1865*. 3 HR. Origins and development of American business, agricultural, and labor institutions; problems, and policies, from 1600 to 1865; influence of economic factors upon American history during this period.
267. *American Economic History Since 1865*. 3 HR. Scope similar to that stated for HIST 266.
268. *The Old South*. 3 HR. (For advanced undergraduate and graduate students.) History of the South-exploring peculiar differences that led to an attempt to establish a separate nation. The geographical limitation permits a detailed study of economic and social forces within the context of the larger national history.
269. *The New South*. 3 HR. Integration of the South into the nation after the Civil War. Emphasis on southern attitudes toward industrialization, commercial agriculture, organized labor, and the African American. Special attention to the southern literary renaissance and conservative and progressive politics of the southern people.
273. *Appalachian Regional History*. 3 HR. Historical survey of Central Appalachia's three phases of development: traditional society of the nineteenth century, the transformation of a mountain society by industrialization at the turn of the twentieth century, and contemporary Appalachia.
274. *The City in American History*. 3 HR. A survey of urban history in the United States, including the colonial period, with emphasis on the nineteenth and twentieth centuries, focusing on physical development of cities (planning, transportation, architecture, suburbanization) and social history.
289. *Introduction to Historic Preservation*. 3 HR. Introduction to historic preservation issues, including law, economics, not-for-profit organizations, site interpretation, architectural history, industrial archeology, federal programs, downtown revitalization, and landmarks commissions.
290. *Introduction to Historical Research*. 3 HR. (Required for history majors; non-majors by consent.) Introduction to research techniques useful for history. Instruction in locating sources, taking notes, and writing research papers.

301. *Readings in Medieval History*. 3 HR. Examination of the literature, bibliography, sources, and research methods on selected problems in medieval history, using discussion and written reports on assigned readings. May be repeated once.

305. *Readings in English History*. 3 HR. Directed readings of scholarly books and articles, primarily in the history of England from about 1450 to about 1700, but with some opportunity for students to fill gaps in their knowledge of other periods of English history. May be repeated once.

309. *Readings in Central European History*. 3 HR. All students will read and discuss selected works illustrating outstanding scholarship or interpretative problems related to fifteenth-, sixteenth, and early seventeenth-century history. In addition, opportunity will be provided for each student to pursue an independent reading project tailored to the student's special interests. May be repeated once.

310. *Historic Site Interpretation and Preservation*. 3 HR. PR: HIST 212. Introduction to historic site interpretation and preservation, including establishing criteria, site inventory, and recording techniques using the "case study" method. Lectures, films, discussions, and field projects will introduce students to the rapidly growing area, including environmental impact work.

311. *Archival Management*. 3 HR. PR: HIST 212. Principles and practices of archival work within a laboratory context. Includes lectures and selected readings illustrated by holdings and policies of West Virginia and Regional History Collection of the WVU Library.

312. *Practicum in Historical Editing*. 3 HR. PR: HIST 212. Principles and practices of historical editing in a laboratory context. Includes lectures and readings with illustrations from ongoing editing projects.

313. *Local History Research Methodology*. 3 HR. Emphasis on research methods applicable to any locality; includes legal records, oral records, secondary sources, photographs, maps, and government documents.

314. *Readings in Eastern European History*. 3 HR. Intensive readings on specific topics in Russian, Soviet or East European history. Students should normally have had History 117 and 118, or their equivalents. Primarily designed for graduate students and selected undergraduates. May be repeated once.

317. *Readings in Western European History*. 3 HR. This course, primarily for graduate students and selected undergraduates, is designed for an intensive reading program on special problems in western European history. May be repeated once.

321. *Readings in Asian History*. 3 HR. Intensive readings in the history of East Asia (especially China and Japan) since the nineteenth century; students should normally have had HIST 225 and 226, or their equivalents; reviews, as well as bibliographical and historiographical essays, required. May be repeated once.

325. *Readings in African History*. 3 HR. This course will normally focus on readings and discussion on problems in the history of pre-colonial Africa, the major works in African history, and recent interpretations in the field. May be repeated once.

330. *Readings in Latin American History*. 3 HR. PR: Graduate status. Critical examination of selected sources and topics for understanding and interpreting Latin American history. May be repeated once.

331. *Readings in American History, 1585-1763*. 3 HR. Supervised readings and reports designed to prepare students for intensive study in a seminar or for field examinations in colonial American history. May be repeated once.

345. *Readings in American Labor History*. 3 HR. PR: Consent. Readings seminar designed to provide a broad knowledge of American labor and working class history by focusing on conceptual issues and methods of research that have shaped the development of this field. May be repeated once.

355. *Readings in American History, 1763-1800*. 3 HR. Readings and reports designed to prepare students for an intensive study in a seminar or field examination. May be repeated once.

356. *Readings in U.S. History, 1787-1850. I.* (Alternate years) 3 HR. Critical examination of major works and themes on the political, economic, social, and legal formation of the nation. May be repeated once.

359. *Readings in U.S. History, 1840-1898.* 3 HR. Survey of interpretative literature on Sectionalism, Civil War, Reconstruction and Gilded Age. Assignments are both oral and written reports on assigned readings and a critical essay on some aspect of American historiography for this period. May be repeated once.

363. *Readings in United States History, 1898 to Present.* 3 HR. Readings and class-led discussion of one paperback book per week, and preparation of a paper based on these books and the class discussion of them. May be repeated once.

373. *Readings in Appalachian Regional History.* 3 HR. A course for graduate students and seniors in the history of West Virginia and neighboring states, which form what is known as the Trans-Allegheny or Upper Ohio region. May be repeated once.

375. *Readings in Science and Technology.* 3 HR. Examination of the literature, bibliography, and sources on selected topics in the history of science and technology. Class discussions and written reports on assigned topics. (May be repeated once.)

382. *Readings in Social History of the United States.* 3 HR. The objective of the course is to establish for graduate students usable frames of reference for selected topics in social history by examining the ways in which historians have written about these topics. May be repeated once.

385. *Readings in Environmental History. II.* (Alternate years) 3 HR. Examines broad themes including settlement patterns, attitudes toward nature, the rise of ecological science, and agricultural and industrial practices. Explores historiographical and methodological issues. May be repeated once.

391. *Advanced Topics.* Variable 1-6 HR. PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

397. *Master's Degree Research or Thesis.* Variable 1-15 HR. PR: Consent. Research activities leading to a thesis, problem report, research paper, or equivalent scholarly project.

402. *Seminar in Medieval History.* 3 HR. PR: HIST 301; reading knowledge of Latin and a modern European language strongly recommended. Directed examination of bibliographic sources and historiographical issues on selected aspects of the Middle Ages, leading to preparation of a research paper based on primary sources. May be repeated once.

406. *Seminar in English History. II.* 3 HR. Research seminar in selected topics in English history from about 1450 to about 1700. One major paper and extensive reading based on available source material is required.

410. *Seminar in Central European History.* 3 HR. An intensive survey of the bibliographical aids and printed source materials available in the field. A research paper and a bibliographical essay will be presented by each student. Reading knowledge of German and French strongly recommended. May be repeated once.

411. *Internship in Public History.* 6 HR. PR: HIST 212 and two intermediate public history courses. A professional internship at an agency involved in a relevant area of public history. Supervision will be exercised by both the Department of History and the host agency. Research report or finished professional project required.

414. *Seminar in Eastern European History.* 3 HR. PR: HIST 117, 118 or equivalent. Research seminar on selected topics in Russian, Soviet, or Eastern European history. One major paper and extensive reading based on available source materials is required. May be repeated once.

418. *Seminar in Western European History.* 3 HR. A research seminar in selected topics in western European history. One major paper and extensive reading based on available source material is required. A reading knowledge of the appropriate languages is required, if applicable. May be repeated once.

422. *Seminar in Asian History.* 3 HR. Advanced readings in East Asian history; specific emphasis on research tools and techniques; research paper based on English-language sources required; students should normally have had HIST 225 and 226 or their equivalents. May be repeated once.

426. *Seminar in African History*. 3 HR. The seminar will normally focus on eastern Africa in the colonial period. Location and use of source materials will be emphasized as well as economic and political developments. Students will spend considerable time in research and writing on selected aspects of eastern African history. May be repeated once.

432. *Seminar in American History*. 1585-1763. 3 HR. PR: HIST 331 or consent. Directed research on colonial American history, using original and secondary materials. May be repeated once.

441. *Seminar in Latin American History*. 3 HR. PR: Consent. Survey of Latin American historiography, location and use of primary source materials, discussion of research techniques, and the writing of a research paper. Reading knowledge of Spanish, Portuguese, or French will be helpful. May be repeated once.

456. *Seminar in American History*. 1763-1830. 3 HR. PR: HIST 355 or consent. Advanced readings and research in revolutionary and early national American history. May be repeated once.

457. *Seminar in U.S. History 1787-1850. II*. (Alternate years) 3 HR. Directed research in early United States history. Research will include primary and secondary sources. May be repeated once.

460. *Seminar in United States History 1850-1898*. 3 HR. Directed research in mid-and late 19th-century American history, including guidance in methods of research and manuscript preparation. May be repeated once.

464. *Seminar in United States History, 1898-Present*. 3 HR. Directed research in recent American history including guidance in method of research and manuscript preparation. May be repeated once.

474. *Seminar in Appalachian Regional History*. 3 HR. A seminar for graduate students in the history of West Virginia and neighboring states, which form what is known as the Trans-Allegheny or Upper Ohio region. May be repeated once.

476. *Seminar in Science and Technology*. 3 HR. PR: HIST 375 or consent. Research seminar in the history of science and technology. Discussion of methods and sources; presentation and critique of research papers based on primary sources. May be repeated once.

481. *Special Problems*. 1-3 HR.

482. *Special Problems*. 1-3 HR.

486. *Seminars in Environmental History. II*. (Alternate years) 3 HR. Directed research involving primary and secondary sources. Will focus on regional case studies and examination of broad intellectual and policy themes. May be repeated once.

489. *Folger Institute Seminar*. 3 HR. PR: Graduate standing. (Enrollment is by special application only. Contact department chairperson for information.) Seminar conducted by distinguished scholars and held at the Folger Institute of Renaissance and Eighteenth Century Studies in Washington, D.C. Topics vary. (Also listed as ENGL 493.)

490. *Teaching Practicum*. 1-3 HR. PR: Consent. Supervised practices in college teaching of history. (Note: This course is intended to ensure that graduate assistants are adequately prepared and supervised when they are given college teaching responsibilities.)

491. *Advanced Study. I, II, S*. 1-6 HR. PR: Consent. Investigation in advanced subjects which are not covered in regularly scheduled courses. Study may be independent or through specially scheduled lectures.

492. *Directed Study. I, II, S*. 1-6 HR. Directed study, reading, and/or research.

493. *Special Topics. I, II, S*. 1-6 HR. A study of contemporary topics selected from recent developments in the field.

494. *Special Seminars. I, II, S*. 1-6 HR. Special seminars arranged for advanced graduate students.

495. *Independent Study. I, II, S*. 1-6 HR. Faculty supervised study of topics not available through regular course offerings.

497. *Graduate Seminar*. 1 HR.

497. *Research*. 1-15 HR. PR: Consent.

498. *Thesis*. 2-4 HR.

499. *Department Colloquium*. 1 HR. PR: Consent. Graduate students in residence must register for the colloquium. Students are expected to enroll continuously for at least two semesters. Credit for this course does not count towards degree requirements.

Humanities (HUM)

Although humanities has no graduate program, the following graduate courses are available.

290. *Special Topics*. I, II. 1-3 HR.

391. *Advanced Topics*. 1-6 HR.

397. *Research*. 1-15 HR.

Liberal Studies

Richard Montgomery, Director
252 Stansbury Hall

Degree Offered: Master of Arts in Liberal Studies

This interdisciplinary program provides an opportunity for highly motivated students to continue their studies beyond the baccalaureate under a coherent program but without the exclusive concentration in one discipline. Studies for this degree should focus primarily on theoretical issues in the liberal arts disciplines such as humanities (English, history, philosophy, religious studies, and foreign languages), the fine arts, or the social sciences.

Curriculum

Each student, in conjunction with a graduate advisor, will put together a personalized curriculum centered around some topic or interdisciplinary area of special interest. Topics might include area studies such as Appalachian studies or French culture; period studies such as the Renaissance or the Enlightenment; or some other area of special interest, such as women's studies, that will tie together work in several different disciplines. The central theme is essential to the degree program to provide coherence and structure; a degree will not be awarded for an unrelated collection of courses. The focus provided by a central topic will ensure that studies are pursued in depth, and justify the granting of a graduate degree.

Faculty

There are more than 750 graduate faculty members at WVU who can be called upon to assist students in their individual plans of study. The program is administered by the master of arts in liberal studies committee, which is appointed by the program director and is responsible for admitting candidates to the program, approving study contracts, overseeing the final evaluation, and determining whether degree requirements have been met. This committee serves roughly the same administrative function for the master of arts in liberal studies (M.A.L.S.) as an academic department serves for more traditional degree programs.

Admission

Requirements for admission to the M.A.L.S. program:

- Baccalaureate degree from an accredited institution.
- Minimum undergraduate grade-point average of 3.0. Probationary status may be granted for those who do not meet this standard but who exhibit clear potential for graduate work.
- GRE General Aptitude Test scores that clearly demonstrate the ability to do graduate work.
- Acceptance by the M.A.L.S. committee of a preliminary study plan for the degree.

Application

To apply for admission to the M.A.L.S. program, the student should simultaneously submit an application for graduate admission to the Office of Admissions and Records and submit an essay of approximately 1,000 words outlining the proposed plan of study to the M.A.L.S. committee. This plan must describe the central focus of the study in some detail and must include a preliminary identification of course work to be taken, along with an indication of how each course relates to the central topic.

The quality of the admissions essay is one of the primary criteria used by the M.A.L.S. committee in making admission decisions. Thus, the essay should be carefully thought out and clearly written; it should provide evidence of direction and motivation as well as mastery of the necessary writing skills. Another criterion for admission to the program is that the proposed plan of study can be carried out at WVU. The applicant should consult the course listings elsewhere in this catalog to determine whether the courses offered are adequate to the proposed study plan. In some cases, the necessary courses may not be available.

Advisory Committee

After admission to the M.A.L.S. program, the student will choose an advisor and a master's committee with the assistance of the M.A.L.S. committee. The advisor will then help the student to draw up a final version of the plan of study, which should include a description of the central, unifying theme, a (possibly revised) list of course work to be taken, with an indication of the relevance of the courses to the central topic, and a description of the final project.

Special Requirements

In addition to the general requirements listed in the graduate catalog for all graduate programs at WVU, the M.A.L.S. program has the following specific requirements:

- A minimum of 36 semester hours of approved course work, subject to the following restrictions: a. Because the degree is intended to be interdisciplinary no more than 18 hours can be taken in one departmental discipline; b. No more than 12 hours of independent study will be approved; c. The program must include at least three hours of course work in research methodology.
- A minimum 3.25 grade-point average for all course work in the degree program.
- Fulfillment of all requirements of the study contract.
- Successful completion of a final project (e.g., a comprehensive examination, research project, a performance project, or master's thesis).

Mathematics

Larry N. Mann, Chairperson

370 Armstrong Hall

Degree Offered: Master of Science, Doctor of Philosophy

Master of Science

Programs are available for students to study applied mathematics, pure mathematics, mathematics combined with another discipline, or mathematics for secondary education. Entering students should have the equivalent of an undergraduate major in mathematics. To be in good standing, a student is expected to maintain at least a 3.0 average (B) in mathematics courses and to present at least a 3.0 average in all work offered in fulfillment of the degree program.

Advisory Committee Each student, upon beginning a graduate program, will be assigned an advisory committee consisting of at least three members of the graduate faculty. This committee will assist the student in designing a written plan of study that takes into account the student's interests and needs as well as the aims of the department's graduate programs. Later changes in the plan are possible only through mutual agreement of the student and the committee.

Programs The student's plan of study is developed in one of these programs: pure mathematics, mathematics for secondary educators, applied mathematics, and interdisciplinary. The programs are designed either for students who intend to pursue a doctor of philosophy in mathematics or for those planning to seek employment in education, government, or industry. Depending upon the program selected, 30 to 33 semester hours are required.

Note: Math 490 may not be counted for credit to satisfy graduate course hour requirements.

Completion Requirement A student with 18 or more hours of graduate study, who has completed the basic required courses with a cumulative average of at least 3.3, may petition the advisory committee to accept the successful completion of a project in lieu of the final examination. Otherwise, all four programs of study require a written final examination.

Doctor of Philosophy

The doctor of philosophy is a research program in which the final product is an original, publishable research thesis. The program requires students to take 28 hours of course work. Areas of focus include number theory, analysis, topology, applied mathematics, combinatorics, and graph theory.

Requirements

Applicants must have completed a graduate degree similar to the M.S. in mathematics outlined above. The following materials should be submitted:

- A WVU admission application.
- An application for financial support.
- Official undergraduate and graduate transcripts.
- Three letters of recommendation from individuals having experience of an applicant's mathematical ability.
- GRE scores for the general test and for the mathematics subject test.
- TOEFL scores for students whose native language is not English.

All doctoral students must demonstrate that they are prepared to undertake doctoral work and research by passing an entrance examination, given each year in May and August, within the first year of study.

Twenty-eight hours of course work are required of all doctoral students. The distribution of these courses is as follows:

- Twelve hours at the 400 level in the student's major area.
- Six hours in each of two minor areas. With the approval of the director of graduate studies, up to one course in a minor area may be at the 300 level.
- Four hours of MATH 496 *Seminar*.

Computer Language Proficiency Proficiency in a computer language at the level of CS 301 or an approved equivalent is required. Reading proficiency in French, German, Russian, or another foreign language, which may be proved through a score of 465 or better on an examination given by Educational Testing Service, or through grades of A or B in a Foreign Language 306 course, is required.

Dissertation Committee After the above requirements are satisfied, a student must request that the director of graduate studies select a dissertation committee of at least five members, with a dissertation advisor as chairperson and one member from outside the department.

Examinations and Dissertation The student must pass a qualifying oral and written examination on the major and minor areas of study. If examination results are unsatisfactory, the dissertation committee may reexamine the student once.

A Ph.D. candidate must complete a dissertation, representing at least 24 hours of 400-level credit, under the supervision of a dissertation advisor. The research upon which the dissertation is based must conform to scholastic standards and constitute an original and publishable contribution to mathematics.

Mathematics (MATH)

213. *Partial Differential Equations*. II. 3 HR. PR: MATH 18. Introduces students in mathematics, engineering, and the sciences to methods of applied mathematics. First and second order equations, canonical forms, wave, heat and Laplace's equations, representation of solutions.

215. *Applied Modern Algebra*. I. 3 HR. PR: Consent. Finite fields, algebraic coding theory, Boolean algebras, monoids, finite state, and Turing machines.

217. *Applied Mathematical Analysis*. II. 3 HR. PR: MATH 18. The algebra and differential calculus of vectors, solution of the partial differential equations of mathematical physics, and application of functions of a complex variable.

219. *Seminar in Applied Mathematics*. I, II. 1-12 HR. PR: Consent. Selected topics in applied mathematics.

220. *Numerical Analysis 1*. I, II. 3 HR. PR: MATH 17 and a programming language. Computer arithmetic, roots of equations, interpolation, Gaussian elimination, numerical integration and differentiation. Numerical solution of initial value problems for ordinary differential equations. Least square approximations. (Equiv. to CS 216.)

221. *Numerical Analysis 2*. II. 3 HR. PR: MATH 220 or CS 216 and MATH 241 or consent. Solutions of linear systems by direct and iterative methods. Calculation of eigenvalues, eigenvectors, and inverses of matrices. Applications to ordinary and partial differential equations. (Equiv. to CS 221.)

224. *Mathematics of Compound Interest*. II. 3 HR. PR: MATH 16 or MATH 128. A problem-solving course focusing on the measurement of interest, annuities, amortization schedules, and sinking funds, and the valuation of bonds and other securities.

228. *Discrete Mathematics*. II. 3 HR. PR: MATH 163. Permutations, combinations, binomial theorem, inclusion-exclusion formula, recurrence relations, generating functions, elementary graph theory (connectivity, paths, circuits, trees, vertex and edge coloring, graph algorithms) matching theory, and discrete optimization. (Equiv. to CS 228.)

231, 232. *Introduction to Mathematics for the Elementary Teacher*. I, II. 3 HR. per sem. PR: MATH 34. (Not open to students who have credit for MATH 131.) (For in-service elementary mathematics teachers.) Systems of numeration; sets, relations, binary operations, the algebraic structure of various number systems; the notions of length, area, and volume; coordinate geometry.

241. *Applied Linear Algebra*. I, II, S. 3 HR. PR: MATH 17 and MATH 18. Matrix algebra with emphasis on algorithmic techniques and applications to physical models. Topics include solution of large systems of equations, orthogonal projections and least squares, and orthogonal projections and least squares, and eigenvalue problems.

251, 252. *Introduction to Real Analysis*. I, II. 3 HR. per sem. PR: MATH 163. A study of sequences, convergence, limits, continuity, definite integral, and derivative, differentials, functional dependence, multiple integrals, sequences, and series of functions.

255. *Advanced Real Calculus*. S. 3 HR. PR: MATH 18. Limits, series, metric spaces, uniformity, integrals. integrals.

256. *Complex Variables*. II. 3 HR. PR: MATH 18. Complex numbers, functions of a complex variable; analytic functions; the logarithm and related functions; power series; Laurent series and residues; conformal mapping and applications.

261. *Mathematical Logic*. 3 HR.

269. *Advanced Topics in Mathematics*. I, II, S. 3-9 HR. PR: Consent. An independent but directed study program the content of which is to be mutually agreed upon by the individual student and instructor.

301, 302. *Combinatorial Analysis*. I, II. 3 HR. per sem. PR: One year of calculus. Permutations, combinations, generating functions, principle of inclusion and exclusion, distributions, partitions, compositions, trees, and networks.

303. *Graph Theory*. 3 HR. PR: MATH 143 and MATH 163. Basic concepts of graphs and digraphs, trees, cycles and circuits, connectivity, traversability, planarity, colorability, and chromatic polynomials. Further topics from among factorization, line graph, covering and independence, graph matrices and groups, Ramsey theory, and packing theory.

305. *Theory of Numbers*. I, II. 3 HR., per sem. PR: One year of calculus. Introduction to classical number theory covering such topics as divisibility, the Euclidean algorithm, Diophantine equations, congruency, primitive roots, quadratic residues, number-theoretic functions, distribution of primes, irrationals, and combinatorial methods. Special numbers such as those of Bernoulli, Euler, and Stirling.

307. *Topics in Discrete Mathematics*. 3 HR. PR: MATH 143 and MATH 163. Topics may include algorithmic graph theory, combinatorial designs, matroid theory, $(0,1)$ -matrices, and permanents.

308. *Applied Discrete Mathematics*. 3 HR. Topics may include combinatorial optimization, applied coding theory, integer programming, linear programming, matching, and network flows.

313. *Intermediate Differential Equations*. II. 3 HR. PR: MATH 17 and MATH 18. A rigorous study of ordinary differential equations including linear and nonlinear systems, self-adjoint eigenvalue problems, non-self-adjoint boundary-value problems, perturbation theory of autonomous systems, Poincare-theorem.

315. *Wave Propagation*. 3 HR. PR: MATH 251 or MATH 317. Study of waves in applied mathematics. The wave equation and geometrical optics, water waves, exact solutions, and interacting solitary waves. Basic concepts of hyperbolic and dispersive waves, conservation laws and scalar PDE's shock waves, Bateman Burgers equation, and hyperbolic systems.

317, 318. *Advanced Calculus*. I, II. 3 HR. per semester. PR: MATH 18. Primarily for engineers and scientists. Functions of several variables, partial differentiation, implicit functions, transformations; line surface and volume integrals; point set theory, continuity, integration, infinite series and convergence, power series, and improper integrals.

319. *Seminar in Applied Mathematics*. 1-12 HR. PR: Consent. Selected topics in applied mathematics. Topics previously offered include applied linear algebra, computational fluid dynamics, numerical partial differential equations, ordinary differential equations, perturbation methods, and stochastic processes.

320. *Solution of Nonlinear Systems*. II. 3 HR. PR: CS 220 or MATH 241. Solution of nonlinear systems of equations. Newton and Secant Methods. Unconstrained optimization. Nonlinear overrelaxation techniques. Nonlinear least squares problems. (Equivalent to CS 320.)

321. *Numerical Analysis*. I. 3 HR. PR: MATH 18 and computer language. Number systems and errors, interpolation by polynomials, linear systems, scalar algebraic equations and systems, optimization, approximation theory, integration initial, and boundary value problems.

322. *Numerical Solution of PDE*. 3 HR. PR: MATH 18 and computer language. Finite difference and finite element methods for elliptic, parabolic, and hyperbolic problems. Study of properties such as consistency, convergence, stability, conservation, and discrete maximum principles.

330. *Introduction to Applied Mathematics*. S. 1-6 HR. PR: Calculus. (Designed especially for secondary-school mathematics teachers; others admitted with departmental approval obtained before registration.) Problem solving and construction of mathematical models in the social, life, and physical sciences. Examples illustrating the origins and use of secondary school mathematics in solving real world problems.

333. *Modern Algebra for Teachers*. I, S. 3 HR. PR: Calculus. (Designed especially for secondary-school mathematics teachers. Others admitted with departmental approval obtained prior to registration.) Introduction to algebraic structures; groups, rings, integral domains and fields. Development and properties of the rational and real number systems.

334. *Modern Algebra for Teachers*. II, S. 3 HR. PR: MATH 141 or MATH 333. Further investigation of algebraic structures begun in MATH 333. (Emphasis on topics helpful to secondary-school mathematics teachers.) Topics include Sylow theory, Jordan-Holder Theorem, rings and quotients, field extensions, Galois theory, and solution by radicals.

335. *Foundations of Geometry*. S. 3 HR. PR: Calculus. (Designed especially for secondary mathematics teachers; others admitted with departmental approval obtained before registration.) Incidence geometries with models; order for lines and planes; separation by angles and by triangles; congruence; introduction to Euclidean geometry.

336. *Transformation Geometry*. S. 3 HR. PR: MATH 141 or MATH 333. (Designed especially for secondary-school mathematics teachers; others admitted with departmental approval obtained before registration.) A modern approach to geometry based on transformations in a vector space setting. The course unifies the development of geometry with the methods of modern algebra.

339. *Special Topics*. I, II, S. 1-12 HR.

341, 342. *Modern Algebra*. I, II. 3 HR. per sem. PR: MATH 141. Concepts from set theory and the equivalence of the Axiom of Choice. Zorn's Lemma and the Well-Ordering Theorem; a study of the structure of groups, rings, fields, and vector spaces; elementary factorization theory; extensions of ring and fields; modules and ideals; and lattices.

343. *Linear Algebra*. II, S. 3 HR. PR: MATH 241. Review of theory of groups and fields; linear vector spaces including the theory of duality; full linear group; bilinear and quadratic forms; and theory of isotropic and totally isotropic spaces.

351. *Theory of Functions of Real Variables*. I, II. 3 HR. per sem. PR: MATH 181 and MATH 252. A development of Lebesgue integral, function spaces and Banach spaces, differentiation, complex measures, the Lebesgue-Radon-Nikodym theorem.

352. *Theory of Functions of Real Variables*. I, II. 3 HR. per sem. PR: MATH 351. A development of the Lebesgue integral, function spaces and differentiation, complex measures, the Lebesgue-Radon-Nikodym theorem. Nikodym theorem.

355. *Theory of Functions of Complex Variables*. I, II. 3 HR. per sem. PR: MATH 252. Number systems, the complex plane and its geometry. Halomorphic functions, power series, elementary functions, complex integration, representation theorems, the calculus of residues, analytic continuation and analytic function, elliptic functions, Halomorphic functions of several complex variables.

356. *Theory of Functions of Complex Variables*. I, II. 3 HR. PR: MATH 355. Number systems, the complex plane and its geometry. Halomorphic functions, power series, elementary functions, complex integration, representation theorems, the calculus of residues, analytic continuation and analytic function, elliptic functions, Halomorphic functions of several complex variables.

357. *Calculus of Variations*. II. 3 HR. PR: (MATH 18 and MATH 252) or MATH 318. Necessary conditions and sufficient conditions for weak and strong relative minimums of an integral, Euler-Lagrange equation. Legendre condition, field construction, Weierstrass excess function, and the Jacobi equation.

361. *Geometric Modeling-Curves/Surf*. 3 HR. PR: MATH 18 and linear algebra. Mathematical techniques used in CAD/CAM environments, including conics, cubic splines, Bezier splines, B-splines rational Bezier and B-splines, interpolation, geometric continuity, and data exchange.

362. *Geometric Modeling-Solids*. 3 HR. PR: MATH 18 and linear algebra. Mathematical techniques used in CAD/CAM environments, including basic primitives, manifold and non-manifold solids, Euler characteristic, half-space models, constructive solid geometry (CSG), boundary representation (B-rep), Euler operators, Boolean operations, and data exchange.

363. *Mathematical Modeling*. 3 HR. PR: MATH 18 and MATH 213. This course is concerned with construction, analysis, and interpretation of mathematical models that shed light on important problems in the sciences. Emphasis is on the simplification, dimensional analysis, and scaling of mathematical models.

381. *Topology*. I, II. 3 HR. per sem. PR: MATH 252. A detailed treatment of topological spaces covering the topics of continuity, convergence, compactness, and connectivity; product and identification space, function spaces, and the topology in Euclidean spaces.

382. *Topology*. II. 3 HR. per sem. PR: MATH 381. A detailed treatment of topological spaces covering the topics of continuity, convergence, compactness, and connectivity; product and identification space, function spaces, and the topology in Euclidean spaces.

383. *Set Theory and Applications*. 3 HR. PR: MATH 341 or MATH 351 or MATH 381. The course concentrates on the typical methods of set theory, transfinite induction, and Zorn's Lemma with emphasis on their applications outside set theory. The fundamentals of logic and basic set theory are included.

385. *Rings Continuous Functions*. 3 HR.

386. *Rings Continuous Functions*. 3 HR.

391. *Advanced Topics*. 1-6 HR.

397. *Research*. 1-15 HR.

400. *Seminar in Number Theory*. I, II. 1-12 HR.

402. *Special Functions*. I, II, 3 HR. PR: MATH 18 and MATH 252. Operational techniques, generalized hyper-geometric functions, classical polynomials of Bell, Hermite, Legendre Noerlund, etc. Introduction to recent polynomial systems. Current research topics.

403. *Advanced Topics in Graph Theory*. 3 HR. PR: MATH 303. Topics may include: Algebraic graph theory, random graph theory, external graph theory, topological graph theory, and structural graph theory. (May be repeated for credit with consent.)

405, 406. *Analytic Number Theory*. I, II. 3 HR., per sem. PR: MATH 306 and MATH 356. Selected topics in analytic number theory such as the prime number theorem, primes in an arithmetical progression, the Zeta function, the Goldbach conjecture.

407. *Advanced Topics in Combinatorics*. 3 HR. PR: MATH 301 and Math 307. Topics may include: Combinatorics on finite sets, probabilistic methods in combinatorics, enumerations, Polya Theory, combinatorial matrix theory, coding theory, combinatorial identities, infinite combinatorics, transversal theory, and matroid theory. (May be repeated for credit with consent.)

414. *Asymptotic Methods*. 3 HR. PR: MATH 313. Study of asymptotic methods for differential equations. Basic concepts - asymptotic expansions, asymptotic approximation; asymptotic evaluations of integrals - Laplace's methods, Kelvin's methods, the steepest descent; asymptotic solutions of equations; perturbation of eigenvectors; the difference between singular and regular perturbations; multiple scale analysis; the method of matched asymptotic expansions; perturbations of periodic systems.

441. *Group Theory*. 3 HR.

442. *Group Theory*. 3 HR.

443. *Algebraic Theory Semigroup*. 3 HR.

444. *Algebraic Theory Semigroup*. 3 HR.

450. *Seminar in Analysis*. 1-12 HR.

451. *Functional Analysis*. I, II. 3 HR., per sem. PR: MATH 181 and MATH 241 and MATH 252. A study of Banach and Hilbert spaces; the Hahn-Banach theorem, uniform boundedness principle, and the open mapping theorem; dual spaces and the Riesz representation theorem; Banach algebras; and special theory.

452. *Functional Analysis*. I. 3 HR. PR: MATH 451. A study of Banach and Hilbert spaces; the Hahn-Banach theorem, uniform boundedness principle, and the open mapping theorem; dual spaces and the Riesz representation theorem; Banach algebras; and special theory. Closures; and special theory.

457. *Theory of Partial Differential Equations*. I, II. 3 HR. per sem. PR: MATH 252. Cauchy-Kowaleski theorem, Cauchy's problem, the Dirichlet and Neumann problems, Dirichlet's principle, potential theory, integral equations, eigenvalue problems, numerical methods.

458. *Theory of Partial Differential Equations*. II. 3 HR. per sem. PR: MATH 457. Cauchy-Kowaleski theorem, Cauchy's problem, the Dirichlet and Neumann problems, Dirichlet's principle, potential theory, integral equations, eigenvalue problems, numerical methods.

460. *Thesis*. I, II. 1-6 HR.

480. *Seminar in Topology*. 1-12 HR.

481, 482. *Continuum Theory*. I, II. 3 HR., per sem. PR: MATH 381. The fundamental properties of continua (compact, connected, metric spaces), including boundary bumping, space filling curves, structure of special continua, and inverse limits.

483. *Set Theory and Applications*. 3 HR. PR: MATH 383. The course elaborates on the applications of the transfinite induction, and combines recursion methods with other elements of modern set theory, including the use of additional axioms of set theory, introduction to the forcing method.

490. *Teaching Practicum*. I, II. 1-3 HR. PR: Consent. Supervised practices in college teaching of mathematics.

491. *Advanced Study*. I, II, S. 1-6 HR. PR: Consent. Investigation in advanced subjects which are not covered in regularly scheduled courses. Study may be independent or through specially scheduled lectures.

492. *Directed Study*. 1-6 HR.

493. *Special Topics*. 1-6 HR.

494. *Special Seminars*. 1-6 HR.

495. *Independent Study*. 1-6 HR.

496. *Graduate Seminar*. I, II. 1 HR. PR: Consent. Each graduate student will present at least one seminar to the assembled faculty and graduate student body of the student's program.

497. *Research*. 1-15 HR.

498. *Thesis*. 2-4 HR.

499. *Graduate Colloquium*. I, II, S. 1-6 HR. PR: Consent. For graduate students not seeking course work credit but who wish to meet residence requirements, use the University's facilities, and participate in its academic and cultural programs.

Philosophy (PHIL)

Although philosophy has no graduate program, the following graduate courses are available.

230. *Philosophy and Culture Criticism*. I. 3 HR. PR: 3 hours of philosophy at 100-level or above, or consent. Recent philosophical analyses and critiques of modern Western culture; its relationship to discursive, social, economic, disciplinary, and gendering practices.

253. *Philosophy of Mathematics*. I, II. 3 HR. PR: PHIL 106 or consent. Contemporary viewpoints in the foundations of mathematics. (Not offered every year.)

283. *Philosophy of History*. I, II. 3 HR. PR: 6 HR. in philosophy or history major or consent. Theoretical problems such as the nature of historical explanation, relativism, and the status of speculative principles of history. (Not offered every year.)

285. *Philosophy of Language*. I, II. 3 HR. PR: 6 HR. in philosophy or linguistic or language major or consent. Philosophical problems concerning the nature of meaning and language. (Not offered every year.)

290. *Directed Studies*. I, II, S. 1-6 HR. (May be repeated for credit.) PR: Instructor's written consent. Individually supervised reading, research, and projects.

292. *Advanced Topics in Philosophy*. I, II. 3 HR. PR: 6 HR. in philosophy or consent. Advanced philosophical investigation of selected problems and issues. Topics will vary.

302. *Philosophy of Science*. I, II. 3 HR. Philosophical problems associated with the concepts and methodology of science. (Not offered every year.)

303. *Theory of Knowledge*. I, II. 3 HR. Definitions of knowledge, truth, and belief. Problems associated with skepticism, induction, perception, introspection, memory, and a priori knowledge.

304. *Health Care Ethics*. I, II. 3 HR. Topics: Clinician-patient relationship, life-sustaining treatment, physician-assisted death, physician/nurse conflicts, confidentiality, research, reproductive technology, abortion, maternal/fetal conflicts, genetics, rationing, and access.

305. *History of Philosophy*. I, II. 3 HR. Selected topics in the history of Western philosophy, usually with concentration on one of the following periods: ancient, medieval, modern, or recent.

306. *Metaphysics*. I, II. 3 HR. Traditional problems associated with universals and particulars, reality and experiences, causality, space and time, matter and mind, the nature of the self, etc.

308. *Ethics of the Marketplace*. I, II. 3 HR. An examination of moral questions regarding the evaluation of economic systems, labor/management relationships, product liability, advertising, codes of conduct, and conflicts of interest. (Not offered every year.)

310. *Ethics*. I, II. 3 HR. An examination of selected theoretical and applied problems in the field of professional ethics. (Not offered every year.)

313. *Philosophy of Social Science*. I, II. 3 HR. PR: Consent. Philosophical problems associated with the concepts and methodology of the social sciences.

321. *Seminar: Selected Topics*. 3-9 HR.

391. *Advanced Topics*. I, II, S. 1-6 HR.

- 397. *Research*. I, II, S. 1-15 HR. (M.A. Research or Thesis) PR: Consent.
- 490. *Teaching Practicum*. 1-3 HR.
- 491. *Advanced Study*. 1-6 HR.
- 492. *Directed Study*. 1-6 HR.
- 493. *Special Topics*. 1-6 HR.
- 494. *Special Seminars*. 1-6 HR.
- 495. *Independent Study*. 1-6 HR.
- 496. *Graduate Seminar*. 1 HR.
- 497. *Research*. 1-15 HR.
- 498. *Thesis*. 2-4 HR.
- 499. *Graduate Colloquium*. 1-6 HR.

Physics

Larry E. Halliburton, Chairperson of the Department
209 Hodges Hall

Degrees Offered: Master of Science, Doctor of Philosophy

The graduate program is designed to provide a solid background in classical and modern physics, a broad understanding of major research fields, and concentrated research experience in one area. Applicants normally enter with a Bachelor of Science degree in Physics. A student whose background is weak in a particular area is encouraged to register for the appropriate undergraduate course. The normal first-year courses include Introduction to Mathematical Physics (387), Quantum Mechanics (351), Advanced Classical Mechanics (331), Advanced Electricity and Magnetism (333), plus possible electives. In courses no distinction is made between those students who intend a terminal M.S. degree and those who will pursue a Ph.D. degree. The minimum grade for credit in graduate courses is C and a grade point average of 3.0 must be maintained.

Qualifying Examinations

After the first year of classes students begin taking the written qualifying exams, which determine their admission to the M.S. or Ph.D. programs. The purpose of these exams is to ensure that each student has the necessary fundamental background to begin research. There are three parts to the exam but the three parts are spread over the calendar year to allow students to prepare for one section at a time. The June exam, which covers Quantum Mechanics, is normally taken after one year of classes. It is followed in August by the Classical Mechanics exam, and in January by the Electricity and Magnetism exam. Students do not have to take the exams in the above order. There is no restriction on retaking any of the exams. A different standard of performance is required for candidacy to the M.S. and Ph.D. degrees, as explained below.

Master of Science

Students who pass two sections of the qualifying examination at the 40 percent level are admitted to candidacy for the M.S. degree. A faculty advisor directs the student's research. The research results must be summarized in a written thesis that is defended before a faculty committee. The M.S. degree requires 24 hours of courses at the 300 level or above, including Physics 331, 333, 351, 383, and 387.

A student may instead earn an M.S. degree without doing thesis research by passing all three sections of the qualifying examination at the 60 percent level and by taking 30 hours of courses at the 300 level or above, including Physics 331, 333, 351, 383, and 387.

Doctor of Philosophy

Students who pass all three sections of the qualifying examination at the 60 percent level are admitted to candidacy for the Ph.D. degree. Research is the central focus of the degree and is directed by a faculty advisor. Early in the research program the student must make an oral presentation to the dissertation committee reviewing some of the published research in his/her subfield of specialization. When the student's research is completed it is described in a written dissertation and defended before the dissertation committee. The average completion time for the Ph.D. is five years beyond the B.S. The Ph.D. degree requires 36 hours of course work at the 300 level or above, with a minimum of 6 hours at the 400 level.

Research Groups

Research groups consist of a professor and several graduate students and/or post-doctoral fellows, with financial support from a federal agency or private industry. Departmental research specialties include condensed matter physics (theory and experiment), nonlinear dynamics (theory and experiment), applied physics (theory and experiment), plasma physics (experiment), astrophysics (theory), and elementary particle physics (theory).

GRE/TOEFL

Applicants are expected to have a bachelor's degree in physics, with upper-division courses in electricity and magnetism, mechanics, quantum mechanics, thermodynamics, and mathematical methods. Students lacking some of these courses may be admitted provisionally and will be allowed to remedy the deficiencies by taking the appropriate courses. The GRE general test is required and the GRE physics subject test is strongly recommended. If English is not the student's native language, TOEFL scores are also required. Application deadline is February 15; contact the department for additional information.

Financial Aid

With rare exceptions, all students who are admitted receive financial support. Beginning students usually receive teaching assistantships; more advanced students receive research assistantships. Several fellowships are available for outstanding students, allowing full-time concentration on course work and research and more rapid progress toward the degree.

Physics (PHYS)

201. *Special Topics*. I, II. 1-3 HR. per sem. (May be repeated to max. of 24 hours.) Study of topics of current interest in physics.

213. *Introductory Electronics*. 3 HR. PR: PHYS 11 and PHYS 12. Principles and applications of integrated circuits and digital electronics. 2 HR. lec, 1 HR. lab.

221. *Optics*. 3 HR. PR: PHYS 11 and PHYS 12 and MATH 18. A basic course in physical optics covering wave mathematics, propagation, polarization, interference, and diffraction; applications in geometrical optics and selected topics in scattering and quantum optics. 3 HR. lec.

225. *Atomic Physics*. 3 HR. PR: PHYS 124 or equiv. Relativistic mechanics, atomic structure, and spectra.

231. *Theoretical Mechanics*. I, II. 3 HR. PR: PHYS 11 and PHYS 12 or equiv.; Conc.: MATH 18. Scalar, vector, and tensor fields; curvilinear coordinate systems. Kinematics and dynamics of particles, systems of particles and rigid bodies. Lagrangian and Hamiltonian formulation. Relativistic motion.

232. *Theoretical Mechanics*. I, II. 3 HR. PR: PHYS 231 or equiv.; Conc.: MATH 18. Scalar, vector and tensor fields; curvilinear coordinate systems. Kinematics and dynamics of particles, systems of particles and rigid bodies. Lagrangian and Hamiltonian formulation. Relativistic motion.

233. *Electricity and Magnetism*. I, II. 3 HR. PR: PHYS 11 and PHYS 12 or equiv., Conc.: MATH 18. Electrostatics, electrostatics in matter, magnetostatics, magnetostatics in matter, Maxwell's equations, reflection and refraction, wave guides and cavities.

234. *Electricity and Magnetism*. I, II. 3 HR. PR: PHYS 233 or equiv., Conc.: MATH 18. Electrostatics, electrostatics in matter, magnetostatics, magnetostatics in matter, Maxwell's equations, reflection and refraction, wave guides and cavities.

241. *Advanced Physics Laboratory*. I, II. 1-3 HR. per sem. PR: PHYS 11 and PHYS 12 and PHYS 124. Experiments in physics designed to implement theory courses, give experience in data taking and instrumentation, and learn methods of data evaluation and error analysis.

248. *Physics Seminar*. I, II. (No credit.) (Suggested for junior, senior, and graduate Physics majors.) These lectures acquaint students with topics of current interest in physics.

251. *Introductory Quantum Mechanics*. I. 3 HR. PR: PHYS 124 and MATH 18. Fundamental principles of quantum mechanics; state functions in position and momentum space, operators, Schrodinger's equation, applications to one-dimensional problems, approximation methods, the hydrogen atom, angular momentum and spin.

263. *Nuclear Physics*. I, II. 3 HR. PR: PHYS 124 and MATH 17. Study of characteristic properties of nuclei and their structure as inferred from nuclear decays and reactions, leading to a knowledge of nuclear forces and models.

271. *Solid State Physics*. I, II. 3 HR. PR: PHYS 124 or equiv. and MATH 17. Properties of crystalline solids; includes crystal structure, interatomic binding, lattice vibrations, electron theory of metals, and the band theory of solids with some applications.

281. *Plasma Physics*. 3 HR. PR: PHYS 11 and PHYS 12, Conc.: PHYS 234. Introductory course in the physics of ionized gases; particle and fluid treatment of plasmas, waves, equilibrium and stability, kinetic theory, and nonlinear effects.

283. *Thermodynamics and Statistical Mechanics*. II. 3 HR. PR: PHYS 124 or equiv., and MATH 17. Introduction to the statistical foundations of thermodynamics; applications of the fundamental laws of thermodynamics to physical and chemical systems.

301. *Special Topics*. I, II. 1-6 HR. per semester. (May be repeated to max. of 24 hours.) PR: Consent. (Primarily for Graduate students.) Specialized topics of current interest in physics.

321. *Optics*. I, II. 3 HR. PR: PHYS 11 and PHYS 12 or equivalent; MATH 17. A basic course in physical optics covering radiation theory, diffraction, interference, polychromatic waves, scattering, polarization, double refraction, and selected topics in quantum optics.

325. *Advanced Atomic Molecular Physics*. I. 3 HR. PR: PHYS 351. A review of the theory of one-electron atoms. The main emphasis is on the theory of two-electron and many-electron atoms: para and ortho helium; central field approximation; Thomas-Fermi theory; Hartree-Fock theory; L-S, J-J, and intermediate coupling; interaction with electromagnetic fields.

331. *Advanced Classical Mechanics*. I. 3 HR. PR: PHYS 231 and PHYS 232 and differential equations. Lagrange and Hamilton form of equations of motion, rigid bodies, small and nonlinear oscillations. Transformation theory, relativistic dynamics, and systems with an infinite number of degrees of freedom.

333. *Advanced Electricity and Magnetism*. I, II. 3 HR. PR: PHYS 233 and PHYS 234 and differential equations. Electrostatic and magnetostatic boundary value problems. Maxwell's equations for time varying fields. Green's functions and integral representations; applications to radiation; diffraction, wave guides, plasma physics, and relativistic motion of charged particles.

334. *Advanced Electricity and Magnetism*. I, II. 3 HR. PR: PHYS 233 and PHYS 234 and differential equations. Electrostatic and magnetostatic boundary value problems. Maxwell's equations for time varying fields. Green's functions and integral representations; applications to radiation; diffraction, wave guides, plasma physics, and relativistic motion of charged particles.

351. *Quantum Mechanics*. I, II. 3 HR. PR: PHYS 251. Breakdown of classical physics, the Schroedinger equation and its interpretation, one dimensional problems, operator methods and abstract Hilbert space, identical particles, three dimensional problems, the hydrogen atom, angular momentum, spin, vector coupling, time independent perturbation theory, variational principle, atomic and molecular structure, semi-classical radiation theory, scattering theory.

352. *Quantum Mechanics*. I, II. 3 HR. PR: PHYS 351. Breakdown of classical physics, the Schroedinger equation and its interpretation, one dimensional problems, operator methods and abstract Hilbert space, identical particles, three dimensional problems, the hydrogen atom, angular momentum, spin, vector coupling, time independent perturbation theory, variational principle, atomic and molecular structure, semiclassical radiation theory, scattering theory.

354. *Outline of Modern Physics*. S. 3 HR. PR: One year introductory college physics. (Primarily for education majors; not open to physics majors.) Elementary study of atomic and molecular structures and spectra, solid state and nuclear physics, relativity and elementary particles.

355. *Workshop for Physics Teachers*. S. 3 HR. per sem. PR: One year college physics; One year of college mathematics. (Primarily for Education majors; not open to Physics majors.) Techniques of apparatus construction and demonstration.

356. *Workshop for Physics Teachers*. S. 3 HR. per sem. PR: One year college physics; One year of college mathematics. (Primarily for Education majors; not open to Physics majors.) Techniques of apparatus construction and demonstration.

358. *Light*. II, S. 3 HR. PR: One year of college physics or equivalent. (Primarily for education majors; not open to physics majors.) A demonstration course designed to illustrate the basic concepts covering light and optics.

371. *Intermediate Solid State Physics*. 3 HR. PR: PHYS 271 and PHYS 351 or equivalent. Crystal structure, reciprocal lattice, phonons, dielectric properties, optical properties, semiconductors, cooperative phenomena including superconductivity and magnetism.

372. *Intermediate Solid State Physics*. 3 HR. PR: PHYS 271 and PHYS 351 or equivalent. Crystal structure, reciprocal lattice, phonons, dielectric properties, optical properties, semiconductors, cooperative phenomena including superconductivity and magnetism.

383. *Statistical Mechanics*. II. 3 HR. PR: PHYS 283 and PHYS 351. Ensemble theory, applications to noninteracting systems, as well as perturbative and approximate treatment of interactions. Typical applications include equilibrium constants, polymers, white dwarfs, metals, superfluids, magnetic transitions.

387. *Intro Mathematical Physics*. I. 3 HR. PR: Calculus, differential equations, PHYS 11 and PHYS 12 or equivalent. Complex variables: series, contour integration and conformal mapping; ordinary differential equations; Fourier series, Laplace transforms; Fourier transforms, special functions; Bessel functions and Legendre, Hermite, and Laguerre polynomials; introduction to partial differential equations; Poisson's equation, Wave equation, and diffusion equation.

388. *Intro Mathematical Physics*. II. 3 HR. PR: Calculus, differential equations, PHYS 11 and PHYS 12 or equivalent. Vector spaces, tensor calculus, group theory, integral equations, calculus of variations, nonlinear systems, and other topics as time permits.

391. *Advanced Topics*. 1-6 HR.

397. *Research*. 1-15 HR.

401. *Advanced Research Topics*. I, II. 3 HR. (May be repeated to max. of 24 hours.) PR: Consent. Specialized topics in field of physics related to the research interests of the department. Open only to students who have completed most of the basic graduate courses.

410. *High Energy Physics*. I. 3 HR. PR: PHYS 351 and PHYS 352. Fundamental particle interactions, field theory, S-matrix expansions, space time symmetries, internal symmetries, unsolved problems.

425. *Advanced Atomic and Molecular Physics*. 3 HR. PR: PHYS 325. Quantum mechanics of atoms and molecules at an advanced level emphasizing the role of symmetry. Necessary material on group theory is included.

463. *Advanced Nuclear Physics*. I, II. 3 HR. PR: PHYS 225, PHYS 252 and PHYS 263. Detailed presentation of nuclear reaction mechanisms, nuclear forces, and theories of nuclear disintegrations.

471. *Advanced Solid State Physics*. II. 3 HR. PR: PHYS 271, PHYS 325 and PHYS 351. Advanced treatment of solid state theory; electronic, vibrational, transport, thermodynamic, and magnetic properties of solids.

481. *Kinetic Theory of Plasma*. 3 HR. PR: PHYS 281 and PHYS 331 and PHYS 334. An advanced course focusing on the Vlasov theory of plasma equilibrium and stability. The application to plasma waves will be emphasized.

482. *Magnetohydrodynamic Theory of Plasma*. 3 HR. PR: PHYS 281 and PHYS 331 and PHYS 334. Theory of ideal magnetohydrodynamics for plasma equilibrium and stability; emphasis on analytic theory in developing the model, describing various equilibria and evaluating plasma stability.

490. *Teaching Practicum*. 1-3 HR.

491. *Advanced Study*. 1-6 HR.

492. *Directed Study*. 1-6 HR.

493. *Special Topics*. 1-6 HR.

494. *Special Seminars*. 1-6 HR.

495. *Independent Study*. 1-6 HR.

496. *Graduate Seminar*. 1 HR.

497. *Research*. I, II, S. 1-15 HR.

498. *Thesis*. 2-4 HR.

499. *Graduate Colloquium*. 1-6 HR.

Political Science

Allan S. Hammock, Chairperson of the Department
316-A Woodburn Hall

Degrees Offered: Master of Arts, Doctor of Philosophy

The master of arts and doctor of philosophy programs in political science are designed to give advanced training to students who desire careers as policy analysts in government or the private sector or who wish to enter selected teaching or research fields with a specialization in public policy (either U.S. domestic or international), American politics, state politics, comparative politics, and/or international politics.

Master of Arts

The master of arts with emphasis in public policy is offered by the Department of Political Science in cooperation with the Department of Economics. It is designed to provide students with a broad knowledge of the policy making process and the many factors influencing public policies at the international, national, state, and local levels of government. A problem-analytic approach, drawn from both economics and political science, is used to develop the ability to comprehend, assess, and evaluate issues, problems, and policies in the public sector. Prospective graduates are expected to be skilled at gathering and interpreting data, reporting, writing, and analyzing policy options and alternatives, and evaluating the intended and unintended consequences of public programs and policies. Most graduates will take jobs in government or with private firms needing specialists in policy analysis.

Prerequisites/Requirements Ideally, applicants for the master of arts degree should have a B.A. in political science (with a minimum of six hours in economics) or a B.A. or B.S. in economics (with a minimum of six hours in political science). However, students from other fields and disciplines are also encouraged to apply. In addition, the applicant should have an overall grade-point average of 2.75, and should submit three letters of recommendation from faculty familiar with the student's work. All students must also submit the Verbal and Quantitative results of the Graduate Record Examination.

In order to remain in good standing, students must maintain a 3.0 cumulative average and receive a 3.0 average in each semester for which they are enrolled. Students who do not maintain a 3.0 cumulative average will be placed on probation and will be suspended if they fail to regain a 3.0 cumulative average in their next nine hours of study.

Admission Admission to candidacy for the M.A. degree requires that the student complete a minimum of 36 hours (exclusive of colloquium) in a specialized curriculum offered by the Department of Political Science and the Department of Economics. This curriculum includes courses in economics, policy evaluation, the policy process, and public policy analysis. In addition, students must complete work in political science methodology and statistical methods. All students must enroll in POLS 499 *Colloquium* each semester in residence.

Research The M.A. degree provides an optional research practicum or internship during the fourth semester of work. The practicum enables the student to conduct actual policy research in a public agency. The practicum will carry an additional six hours of graduate credit. Students may also choose a six-hour thesis option.

Examinations Students will be expected to pass final written/oral examinations in policy analysis. Students who fail examinations may be allowed to retake them at the next regularly scheduled examination period. It is contrary to departmental policy to give a third examination.

Doctor of Philosophy

The doctor of philosophy degree is designed for persons planning careers either as policy analysts in government or as researchers and teachers in institutions of higher education. Those students who choose to enter the Ph.D. program emphasizing policy analysis will receive training appropriate for persons who wish to undertake research and analysis on public issues in government, both foreign and domestic. This training includes a comprehensive knowledge of policy formulation, implementation, and evaluation and a thorough understanding of the dynamics of political institutions. A central focus of the policy studies option will be competence in research methodology and statistical techniques of policy analysis.

Those students who choose to enter the Ph.D. program with the intention of entering the field of research and teaching may concentrate on policy studies or take a more traditional curriculum that features four fields: American national and state politics, international relations, comparative politics, and public policy and administration.

Admission Admission to the Ph.D. program is open to students with either a bachelor's or a master's degree. Students with degrees in political science, economics, public administration, sociology, psychology, engineering, social work, business, law, medicine, or journalism are encouraged to apply. An undergraduate applicant should have a grade-point average of 3.0; a graduate applicant 3.5. In addition, all applicants must submit the results of the Graduate Record Examination and at least three letters of recommendation from faculty familiar with the applicant's work. Admission will be based on an overall assessment of the individual's record.

Candidacy The work of all individuals admitted to the doctoral program will be formally evaluated at the end of the first two semesters (at least 18 credit hours of study) at which time one of the following recommendations is made: (1) admission to candidacy for the doctoral degree; (2) admission to the master's degree program in public policy studies; or (3) termination.

The program of each person admitted to the doctoral program is designed in accordance with his or her career objectives and previous training. A complete description of the Ph.D. program and course requirements may be obtained by writing the Director of Graduate Studies, Department of Political Science, West Virginia University, Morgantown, WV 26506. This should be done before application to the program.

Minimum Requirements

The following constitute the formal minimum requirements of the Ph.D. program:

Public Policy Option

Public Policy Core (18 hrs)
Policy Research Methods (15 hrs)
Economics (6 hrs)
Policy Field (18 hrs)
Dissertation (24 hrs)
Total: 81 hrs

General Option

Public Policy (15 hrs)
Research Methods (12 hrs)
Elective Specialty I (15 hrs)
Elective Specialty II (15 hrs)
Dissertation (24 hrs)
Total: 81 hrs

In addition to the formal course work, students must also pass written and oral comprehensive examinations in their specialty fields. All course work completed for the M.A. at West Virginia University also counts toward the Ph.D. Course work from other institutions will be evaluated on a case-by-case basis.

In order to remain in good standing, students must maintain a 3.0 cumulative average and receive a 3.0 average in each semester for which they are enrolled. Students are required to spend at least one year (two semesters) in residence enrolled in a full-time graduate program of no less than nine semester hours each semester. All graduate students must enroll in POLS 499 (Colloquium) each semester in residence.

Faculty

The Department of Political Science has 18 full-time faculty members. The major strengths of the graduate faculty are: policy studies (15 faculty with policy specialties); American national and state politics and administration (eight faculty with U.S. politics and institutional specialties); international and comparative politics (four faculty with international affairs specialties, including U.S. foreign policy, comparative foreign policy, and national security policy); comparative politics (three faculty with comparative politics specialties, including development politics, African, Western European, Canadian, and Far Eastern area studies, and cross-national political analysis); research methods (two faculty with advanced statistical analysis specialties); and policy fields (ten faculty with policy specialties in criminal law, development, political economy, energy, environment foreign policy, gender, national security, regulation, and social welfare). In addition, faculty in the Department of Public Administration and the Department of Economics teach courses included in the M.A. and Ph.D. curricula.

Research

Graduate students have opportunities to conduct research with the political science faculty, faculty associated with the Policy Analysis Group, the Institute for Public Affairs, and other research organizations at the University, and with externally funded grant projects. Opportunities exist for field experience in various government settings, including the West Virginia Legislature, which annually provides paid internships for graduate students in the M.A. or Ph.D. programs.

Financial Aid

The department has a number of assistantships and fellowships available for students in both the M.A. and Ph.D. programs. Students interested in financial assistance should apply directly to the Department of Political Science. Graduate assistants may enroll for no more than nine credit hours per semester (excluding colloquium)

Political Science (POLS)

210. *The American Presidency*. I, II. 3 HR. Institutional, behavioral, and societal forces which have given rise to the modern presidency; factors which enhance and constrain the exercise of presidential power over those constituencies with which the president must interact; the nature and consequences of the presidential decision-making process; desirability and/or feasibility of reforming the presidency.

211. *Political Parties & Elections*. II. 3 HR. Parties and elections in America; emphasis on nomination and general election processes, campaigns, the mass media, campaign finance, voting, the electoral college, and parties in government.

212. *Appellate Judicial Process*. II. 3 HR. PR: POLS 110 or consent. The role of appeals courts and judges in American politics. Topics include appellate court organization and processes, the quantitative and qualitative analysis of judicial behavior, and the influence of courts on public policy.

213. *American Constitutional Law*. I, 3 HR. The role of the Constitution in the American political system. Topics covered include the political concept of constitutionalism; the role of the Supreme Court in the political process; division of powers among the three branches of government; and the constitutional relation between the national government and the states.
214. *Civil Liberties in the U.S.* I, II, 3 HR. Issues in constitutional law concerning personal liberties against government action. Topics include free speech, press and association; religious freedoms; abortion; the right to privacy; due process of law; and criminal procedure safeguards.
215. *Law and Public Policy*. I, II, S, 3 HR, PR: POLS 110 or consent. Advanced examination of the role of trial courts in policymaking, including agenda-setting and policy formulation by courts, the outcomes of policy litigation, and the politics of legal reform.
216. *Public Opinion and Politics*. I, II, 3 HR. In-depth treatment of the origins, content, and impact of public opinion in American politics; political ideology, partisanship, socialization, mass media, opinion polls, and survey research techniques.
217. *Interest Groups and Democracy*. I, II, S, 3 HR, 3 HR. The role of interest groups in American politics, focusing on their distribution and internal dynamics, their involvement in campaigns and elections, their influence on public policy, and their place in a democratic system.
218. *The Legislative Process*. II, 3 HR. Structure, organization and processes of legislative bodies; powers of the legislature; detailed study of law-making procedures; and role of outside forces.
221. *West Virginia Government*. I, II, 3 HR. Organization and operation of the state government of West Virginia.
231. *Criminal Law, Policy and Administration*. I, II, 3 HR. Legal and administrative approach to policy issues in criminal justice. Focuses on the criminal law, police, court decisions, and the implementation of law and policy in the criminal field.
233. *Politics of Social Welfare*. I, II, 3 HR. Questions of poverty and inequality; who are the poor, what causes economic inequality, what have been governmental and private solutions to the problem of poverty, and what successes and failures have there been in the war against poverty.
234. *Politics of Economic Policy*. I, II, 3 HR. An examination of U.S. economic policy, with an emphasis on the political considerations that influence policy development and implementation in government regulation, taxation, and spending.
235. *Civil Rights Policy and Politics*. II, 3 HR. Analysis of the law, politics, and policy related to discrimination in public accommodations, voting, education, housing and employment based on race, gender, national origin, handicapped status, and age.
236. *Energy Policy and Politics*. II, 3 HR. Explores the formulation and implementation of energy policy, including a discussion of scientific, risk, technological, economic, and political variables affecting policy with emphasis on national security, environmental protection, resource management and economic growth problems.
238. *Environmental Policy*. I, 3 HR. Explores the formulation and implementation of environmental policy, using both a policy process approach and policy analysis. Includes a discussion of the scientific, risk, technological, economic, and political variables which affect policy making in this area.
242. *Bureaucratic Politics*. I, 3 HR. Analysis of the nature and processes of American public administration (political, legal, economic, and social), including the role of bureaucracy in a democracy. (Equivalent to PUBA 242).
244. *Administrative Law*. II, 3 HR. Administrative powers and limitations, procedures in administrative adjudication and rule-making, discretion, ultra vires as a check on administrators, notice and hearing, administrative penalties, judicial control, and administrative liability.
250. *Government of Japan*. II, 3 HR. Survey of political institutions and governmental process of Japan with special emphasis on the analysis of political problems in the post-war period.
251. *Russian/Post-Soviet Politics*. II, 3 HR. Survey of politics and government in Russia and in the states of the former Soviet Union.

253. *Western Democratic Governments*. I, II. 3 HR. Cross-national and/or country based analysis of selected western democracies. Individual countries analyzed will vary, but may include Canada, Great Britain, France, Germany, Italy, and the European Union.
254. *Government of China*. I. 3 HR. Survey of political institutions and governmental processes of the People's Republic of China with special emphasis on the analysis of political problems since 1949.
255. *Governments of Latin America*. I. 3 HR. Comparative study of the government and politics of the Latin American states.
256. *Politics of the Middle East*. II. 3 HR. Survey of the domestic and international political dynamics of the Middle East.
258. *Politics of Africa*. II. 3 HR. Historical legacies and current political processes of tropical African countries.
261. *International Organization*. II. 3 HR. Agencies created since the close of World War II. Some reference to the development of international law and the United Nations.
263. *Public International Law*. I. 3 HR. Law governing relations among nations, including development of rules, means of enforcement, and conflict between theory and practice.
264. *American Foreign Relations*. I. 3 HR. PR: POLS 160 or consent. Examination of contemporary U.S. foreign policy and its historical, cultural, and domestic political roots. Substantive and theoretical issues in understanding foreign relations since WWII, including both continuity and change in the emerging post-cold war system.
266. *Post-Soviet Foreign Policy*. II. 3 HR. The origins and conduct of foreign policy during the Soviet and post-Soviet periods. Emphasis will be placed on the foreign policy of the former Soviet Republics.
267. *Latin America in International Affairs*. II. 3 HR. Relations of Latin American states among themselves, with the United States, the United Nations, regional organizations, and nonwestern states. Analysis in depth of the Monroe doctrine and its corollaries and the inter-American system.
268. *Politics of War and Peace*. 3 HR. PR: POLS 160 or consent. Analysis of great power politics in the international system. Examination of theories of war, historical patterns of the balance of power, and origins of the 20th Century's major conflicts: WWI, WWII, and the Cold War.
269. *Far East International Affairs*. II. 3 HR. International relations of countries of the Far East with emphasis on historic roots of recent conflicts, the roles of the United States and other major powers, confrontation between the countries in the region, and the regional cooperation and security problems in the post-World War II period.
272. *Modern Political Thought*. I. 3 HR. Beginning with early Marxist thought, this course examines the evolution of the concepts of rights, justice, liberty, democracy, and equality from 1850 through the present, using the works of both classical and contemporary political theorists.
273. *American Political Philosophy*. I, II. 3 HR. Major American political ideas and their influence upon American society and government from the seventeenth century to the present.
275. *Psychological Theories of Politics*. II. 3 HR. Introduction to rational choice theory and various psychological theories of politics; application of psychological theories to both international relations and American politics.
299. *Special Topics. I, II. 1-3 HR.*
300. *Introduction to Political Research*. I. 3 HR. Introduction to the research methods and techniques used in political and policy analysis. Topics include logic of inquiry, research design, measurement, and survey and unobtrusive research.
310. *Intergovernmental Relations*. I. 3 HR. Examination of the politics and policy consequences of intergovernmental relations among the national, state, and local governments in the United States. Topics include the development of intergovernmental relations, regulatory federalism, and intergovernmental fiscal relations. (3 hr seminar.)

330. *Policy Analysis*. I. 3 HR. Overview of the field of political science and the sub-field of public policy studies. Focuses on the issues and problems involved in studying policymaking, and an assessment of policy analysis as a mode of thinking and inquiry. (3 HR. Seminar.)

331. *Economic Analysis of Politics*. I. 3 HR. Application of economic analysis to questions of politics and public policy. Consideration of problems of public goods, voting behavior, and legislative behavior. (3 HR. seminar.)

336. *Politics of Agenda Setting*. I, II. 3 HR. Examines the social, economic, institutional and political influences on the development of public problems and their placement on the policy agenda. (3 HR. seminar.)

345. *Public Administration & Policy*. II. 3 HR. Decision-making and policy development in the administrative process. (3 HR. seminar.)

351. *Politics of Planned Development*. I. 3 HR. Political aspects of social, economic, and technological change, with special reference to the politics of development planning and administration. (3 HR. Seminar)

355. *Comparative Public Policy*. I, II. 3 HR. Comparison of public policy stages in several advanced industrial democracies with emphasis on various explanations of public policy in these countries in different policy areas. (3 HR. seminar.)

360. *International Theory & Policy*. I. 3 HR. Survey of theoretical approaches in the study of international relations, covering major works in the realist, neoliberal, and foreign policy literature. Emphasis on the place of foreign policy explanations within the wider, systemic international relations literature. (3 HR. seminar.)

391. *Advanced Topics*. 1-6 HR.

397. *Research*. 1-15 HR.

400. *Quantitative Political Analysis*. II. 3 HR. PR: POLS 300 and STAT 311, or equivalents. Application of a range of statistical techniques in political and public policy research. Includes use of selected computer software commonly used in political science and policy analysis.

401. *Advanced Quantitative Methods*. I. 3 HR. PR: POLS 400 or equivalent advanced topics in quantitative methods for political science and policy research. Methods surveyed include multiple linear regression, time-series analysis, causal modeling, and linear programming.

403. *Internship*. I, II. 6-9 HR. per semester; students may enroll more than once. PR: Consent.

410. *Judicial Politics, Policy & Law*. I. 3 HR. Judicial influence on American public policy with emphasis on the political theory of American law, the agenda of disputes, the formulation of public policy by courts, and the effects of judicial policy on politics. (3 HR. seminar)

429. *Seminar: State and Local Government*. I, II. 3 HR. Examination of selected topics in state government and politics. (3 HR. seminar)

430. *Seminar: American Politics & Policy*. I. 3 HR. A survey of classic and contemporary literature on U.S. politics and policy. Emphasis on how various institutions and linkage mechanisms affect the policy process. (3 HR. seminar.)

435. *Seminar: Policy Evaluation*. II. 3 HR. Methods and techniques in evaluating public policies. Topics include the relation of policy analysis to policymaking; types of evaluation; planning, evaluations; alternative evaluation designs; measuring program consequences; problems of utilization, and the setting of evaluation research. (3 HR. seminar)

438. *Seminar: Policy Implementation*. II. 3 HR. Research seminar focusing on how the intentions of policy-makers are transformed into programs and policies which have both intended, and unintended consequences. Topics include traditional implementation studies, neo-institutionalism, rational choice approaches, and principal-agent theory. (3 HR. seminar.)

439. *Research in Policy Analysis*. I, II. 3 HR. Supervised, independent research on a policy problem utilizing the techniques and methods of quantitative policy research. Designed for advanced students, the research project follows the completion of the department's research methods sequence.

480. *Thesis*. I, II. 2-6 HR.

490. *Teaching Practicum*. 1-3 HR.

491. *Advanced Study*. I, II. 1-6 HR. PR: Consent.

492. *Directed Study*. 1-6 HR.

Psychology

Philip N. Chase, Chairperson of the Department
101-A Oglebay Hall

Degrees Offered: Master of Arts, Doctor of Philosophy

Programs Offered

The doctoral degree programs in behavior analysis, lifespan developmental psychology, adult clinical psychology, and child clinical psychology prepare students for careers in teaching, research, and/or practice. The professional master's degree in adult clinical or child clinical psychology prepares students for work in community mental health centers, medical facilities, mental health and mental retardation institutions, and school systems.

Admission

Students are admitted only at the beginning of the fall semester. Application must be completed by the preceding January 15. Acceptance is based on:

- Adequate academic aptitude at the graduate level as measured by the Graduate Record Examination;
- Achievement in undergraduate course work, with a minimum grade point average of 3.0 required;
- Personal qualities that predict success in graduate study and as a professional after graduation;
- Adequate preparation in psychology and related fields; and
- Fit between the applicant's interests and the offerings of a department graduate program.

Courses

Graduate courses in psychology are open only to regular graduate students except by special departmental permission. Students in the master of arts and doctor of philosophy programs must have a final 3.0 average in all psychology courses attempted.

Master of Arts Requirements

Two years of full-time study with a minimum of 48 hours of credit are required for the master of arts degree. Six hours of credit may be counted for the M.A. thesis. Students who are accepted into one of the Ph.D. programs are required to complete an M.A. thesis and will receive the M.A. degree upon completing the thesis and credit-hour requirements. Students accepted into the professional M.A. degree track in clinical psychology must complete a specified sequence of courses and complete a six-month, full-time internship. Completion of a thesis is optional in the professional M.A. track.

Doctor of Philosophy Requirements

Students are accepted for study toward the doctor of philosophy degree upon entry into the department. Each program requires completion of a specific set of required courses and electives (described in detail in the Department Graduate Handbook). Students are formally admitted to doctoral candidacy after completion of the master's degree or its equivalent, a comprehensive preliminary examination, and other requirements.

A dissertation and oral examination on the dissertation are required for all Ph.D. candidates. Students in the clinical psychology programs must also complete a 12-month internship. The internship must be approved by the program and by the director of clinical training.

Non-Degree Students

Graduate courses in psychology are designed for regularly admitted degree-seeking students as part of an extensive program of preparing those students for professional careers. Thus, students not admitted into one of the psychology graduate programs are discouraged from taking graduate courses in psychology. Non-psychology graduate students must obtain the instructor's permission to enroll in any psychology graduate course.

Psychology (PSYC)

213. *Directed Studies*. I, II, S. 1-3 HR. PR: Consent. (No more than 10 hours may be applied to the 42 hours of psychology to which Psychology majors are limited.) Individually supervised reading, research and/or applied projects.

218. *History & Systems of Psychology*. I or II. 3 HR. PR: (PSYC 101 or PSYC 102 or PSYC 141 or PSYC 151 or PSYC 164 or PSYC 170 or PSYC 191) and junior or senior psychology major. A survey of psychology from its origins in philosophy, biology, and physics through the early major schools of psychological thought to modern perspectives on the science of behavior and its applications to human affairs.

223. *Cognition & Memory*. I or II. 3 HR. PR: PSYC 102 and junior or senior psychology major. Theoretical and empirical issues in cognitive psychology. Topics include mechanisms and theories of attention, memory, language, and conceptual processes.

224. *Learning & Behavior Theory*. I or II. 3 HR. PR: PSYC 171 and junior or senior psychology major. Advanced course in empirical and theoretical issues in the psychology of learning.

225. *Perception*. I or II. 3 HR. PR: PSYC 102 and junior or senior psychology major. Survey of the structure and function of human sensory systems (primarily visual and auditory), perceptual issues and theories.

226. *Physiological Psychology*. I or II. 3 HR. PR: PSYC 131 and junior or senior psychology major. Advanced study of the physiological mechanisms of behavior. Topics include neural and endocrine mechanisms of behavior and issues, methods, and findings in behavioral neuroscience.

242. *Prenatal & Infant Development*. I or II. 3 HR. PR: PSYC 141 and junior or senior psychology major. Behavior and development from conception to 2 years. Includes behavioral genetics and hazards of prenatal development, as well as sensory-motor, cognitive, language, and socioemotional behavior during infancy.

243. *Child & Adolescent Behavior*. I or II. 3 HR. PR: PSYC 141 and junior or senior psychology major. Theory and research on major psychological processes in childhood and adolescence; maturation, personality, socialization, sensory, and cognitive development.

245. *Adulthood and Aging*. I or II. 3 HR. PR: PSYC 141 and junior or senior psychology major. Psychological issues in the study of adulthood, with an emphasis on the characteristics of older adults. Topics include the psychosocial and biological context of aging, cognitive and personality changes from early to late adulthood, psychopathology in later life, dementia, issues in caregiving, and death and dying.

251. *Social Psychology*. I or II. 3 HR. PR: PSYC 151 and junior or senior psychology major. Social factors that determine human behavior, survey of research in selected areas of social psychology and their implications for social phenomena.
262. *Psychological Assessment*. I or II. 3 HR. PR: (PSYC 101 or PSYC 102 or PSYC 141 or PSYC 151 or PSYC 164 or PSYC 170 or PSYC 191) and junior or senior psychology major. Theory and practice in development and use of psychological assessment procedures. Includes intelligence testing, behavioral assessment, and interviewing.
263. *Personality Theory*. I or II. 3 HR. PR: (PSYC 101 or PSYC 102 or PSYC 141 or PSYC 151 or PSYC 164 or PSYC 170 or PSYC 191) and junior or senior psychology major. Theoretical and empirical readings in a survey of major perspectives in personality theory, including dynamic, cognitive, humanistic, and behavioral.
264. *Psychology of Adjustment*. I or II. 3 HR. PR: (PSYC 101 or PSYC 102 or PSYC 141 or PSYC 151 or PSYC 164 or PSYC 170 or PSYC 191) and junior or senior psychology major. Dynamic principles of human personality adjustment.
274. *Behavior Modification*. I, II. 3 HR. PR: PSYC 171 and junior or senior psychology major. Basic principles of behavior and their application to changing significant human behavior. Includes clinical, educational, parenting, industrial/organizational, community, and other applications.
279. *Community Psychology*. II. 3 HR. PR: (PSYC 101 or 102, or 141, or 151, or 170 or 191) and junior or senior psychology major. Psychological principles applied to treatment and intervention at the community level; manpower development, organizational change, and systems analysis.
281. *Abnormal Psychology*. I, II. 3 HR. PR: (PSYC 101 or 102, or 141, or 151, or 170 or 191) and junior or senior psychology major. Major categories of behavior disorders; etiology, prevention, and treatment.
282. *Exceptional Children*. I or II. 3 HR. PR: PSYC 141 and junior or senior psychology major. Exceptional mental retardation or advancement; organic disabilities having behavioral consequences, such as cerebral palsy or deafness; and behavior disorders.
295. *Seminar in Psychology*. I or II. 3 HR. (May be repeated for credit.) PR: (PSYC 101 or PSYC 102 or PSYC 141 or PSYC 151 or PSYC 170 or PSYC 191) and junior or senior psychology major. Presentation and discussion of selected topics.
297. *Honors Investigation & Thesis*. I, II, S. 3 HR. (May be repeated for credit; max. credit 6 HR.) PR: Junior or senior psychology major and admission to Honors Program in Psychology. Supervised readings and investigation culminating in the honors thesis.
301. *Professional Issues in Psychology*. I, II. 1-3 HR. (May be repeated for credit with consent.) Survey of professional issues in psychology as they relate to a particular sub-discipline, topic, or issue.
302. *Ethical Issues in Psychology*. II. 1-3 HR. (May be repeated for credit with consent.) The ethical standards for psychologists are applied to research and clinical problems.
303. *Legal Issues in Psychology*. II. 1-3 HR. (May be repeated for credit with consent.) Review of the major areas in which psychologists interact with the civil and criminal legal systems.
311. *Research Design & Data Analysis 1*. I. 3 HR. Principles of experimental design in psychology including group and single subject methodologies. Topics include: (1) internal and external validity; (2) simple and complex analysis of variance; and (3) reversal and multiple baseline designs.
312. *Research Design & Data Analysis 2*. II. 3 HR. PR: PSYC 311. Inferential statistics, simple correlation and regression, multiple correlation and regression, partial correlation, analysis of power, analysis of covariance, analysis of variance of designs with unequal cell sizes.
313. *Directed Study*. I, II, S. 1-3 HR. (May be repeated for credit.) PR: Consent. Directed reading and research in special areas.

315. *Multivariate Analysis*. I. (Alternate years) 3 HR. PR: PSYC 311. Data analysis techniques in psychology with application to typical research problems. Includes simple matrix algebra, discriminant analysis, multivariate analysis of variance, and an introduction to factor analysis. (Equiv. to STAT 341.)

316. *Quasi-Experimental Design*. I. (Alternate years) 3 HR. PR: PSYC 311 and PSYC 312. Consideration of the statistical procedures used with quasi-experimental group and single-subject designs.

320. *Experimental Analysis of Behavior*. I. 3 HR. Research and theory in the psychology of learning. Assessment of traditional and behavior-analytic approaches to the study of positive reinforcement, aversive control, and stimulus control. Includes laboratory work with animals.

321. *Human Behavior*. I. (Alternate years) 3 HR. PR: PSYC 320. Review of the role of basic human operant research in testing the generality of animal-based behavior principles, analyzing phenomena that are specific to humans, and extending behavior analysis to traditional psychological problems.

323. *Applied Behavior Analysis*. II. (Alternate years) 3 HR. PR: PSYC 320. Methodological, empirical, and conceptual issues in the application of basic research in behavior analysis to problems of social significance.

341. *Methodological Issues in Developmental Psychology*. II. (Alternate years) 3 HR. Methodological issues in psychological research on the major age periods and the life span. Topics include: validity; reliability; age, cohort, and time of measurement; cross-sectional, longitudinal, and mixed designs; data analytic methods; ethical issues.

342. *Conceptual Issues in Developmental Psychology*. II. (Alternate years) 3 HR. History, philosophies, and theories of psychological development in the major age periods and the life span; conceptual issues such as nature-nurture, sex differences, cultural differences, life events, rigidity-plasticity, continuity-discontinuity, and competence-performance.

344. *Infant Behavior & Development*. I. (Alternate years) 3 HR. Evaluation of current research literature in the areas of physical, cognitive, perceptual, language, and socioemotional development from conception to approximately 2 years.

347. *Child & Adolescent Cognitive Development*. (Alternate years) I. 3 HR. Examination of psychological literature on child and adolescent cognitive development. Topics include perception, learning, language, problem solving. Social cognition, and others. Research and theory are emphasized.

348. *Child & Adolescent Social Development*. I. (Alternate years) 3 HR. Examination of the psychological literature on child and adolescent social/emotional development. Topics include: parent-child, peer, and sibling relationships; effects of marital and family functioning; friendship; aggression; and altruism. Research and theory are emphasized.

349. *Adult Development & Aging*. I. (Alternate years) 3 HR. Current issues in research on adulthood and aging. Issues addressed include societal and biological influences on adult aging; theoretical accounts of cognitive aging; areas of positive development; personality change; psychopathology; caregiving and family issues; and death, dying, and bereavement.

364. *Child Behavior Modification*. I. 3 HR. Assessment, intervention, and evaluation strategies appropriate for childhood disorders and based on behavior principles.

375. *Fundamentals of Gerontology*. I. 3 HR. PR: MDS 50. An advanced multidisciplinary examination of current research in biological, psychological, and sociological issues of human aging and the ways in which these impinge on the individual to create both problems and new opportunities. (Also listed as BIOL 375.)

379. *Introduction to Clinical Psychology*. I. 3 HR. Basic interviewing skills and current problems in the practice of clinical psychology.

381. *Behavior Pathology*. II. 3 HR. Advanced study of diagnostic classification, functional analysis, and experimental research in psychopathology of child, adult, and geriatric adjustment problems.

384. *Biological Aspects of Behavior*. II. (Alternate years) 3 HR. PR: Consent. Overviews of the areas of psychological investigation that pertain to the relation between biology and psychology, including neuroscience, psycho biological theories of personality and development, neurological and neuropsychological assessment, psychophysiology, and biologically-based treatment strategies, including basic psycho pharmacology.
390. *Seminar on Teaching Psychology*. I, II. 1-3 HR. (May be repeated for credit with consent.) PR: Consent. Review and discussion of methods and issues in college teaching of psychology.
397. *Research*. I, II. 1-6 HR. PR: Consent.
411. *Single-Subject Research Methods*. II. (Alternate years) 3 HR. PR: PSYC 311 and PSYC 320. Critical evaluation of single-subject designs in basic and applied research. Major topics include single-subject methodology's historical and conceptual bases, its relation to group-statistical methods, and its role in behavioral psychology.
415. *Advanced /Experiential: Analysis of Behavior*. I. 3 HR. (May be repeated for credit with consent.) PR: PSYC 320. Selected topics and research issues in the experimental analysis of behavior.
416. *Advanced Applied Behavior Analysis*. I, II. 3 HR. (May be repeated for credit with consent.) PR: PSYC 323. Application of research and theory in behavior analysis to social problems; other selected topics.
417. *Research Issues in Behavior Analysis*. I, II. 3 HR. (May be repeated for credit with consent.) PR: Consent. Examination of research issues in general psychology from a behavior analytic perspective. Topics vary from year to year.
419. *Seminar in Methodology*. I, II. 1-3 HR. (May be repeated for credit with consent.) Current problems and techniques in research design, data analysis, and research methods.
420. *Reinforcement & Punishment*. II. (Alternate years) 3 HR. PR: PSYC 320. Examination of theories of response acquisition, maintenance, and suppression in the context of recent experimental work with animals and humans.
421. *Behavior Theory & Philosophy*. I. (Alternate years) 3 HR. PR: PSYC 320 or equivalent. Critical consideration of contemporary concepts, theories, and methods of psychology.
423. *Behavior Analysis Practicum*. II. 3 HR. PR: PSYC 323 and consent. Supervised applied behavior analysis experience integrated with a seminar emphasizing group solutions to problems that individuals encounter in students' applied projects. Progress and final project reports are presented and evaluated. (1 HR. seminar; 2 HR. practicum.)
424. *Social Behavior*. II. (Alternate years) 3 HR. Examines current concepts, research, and findings in social psychology from various perspectives. Focuses on understanding and explaining the social context of individual and group behavior.
425. *History & Systems*. II. (Alternate years) 3 HR. Study of the history of psychology from its roots in physics, biology, and philosophy. The development of American psychology is emphasized.
426. *Stimulus Control and Memory*. II. (Alternate years) 3 HR. PR: PSYC 320 or consent. Critical review of basic research and theory in discrimination learning, stimulus generalization, and memory.
427. *Advanced Behavior Analysis Practicum*. I, II, S. 1-6 HR. PR: PSYC 423 or consent. Supervised applied behavior analysis experience in an approved setting.
436. *Topical Seminar: Cognitive Development*. II. (Alternate years) 3 HR. (May be repeated for credit with consent.) Topical seminar on current issues in cognition and learning over the life-span or during selected periods of the life-span.
437. *Practicum in Developmental Psychology*. I, II, S. 1-6 HR. PR: Consent. Provides experience in a wide range of applied settings. Sites are chosen to accommodate exposure to the entire life-span from infancy through old age. Supervising responsibilities are determined by the instructor-in-charge in the agency.

442. *Topical Seminar: Life-Span Development*. II. 3 HR. (May be repeated for credit with consent.) Topical seminar exploring a particular period of the life-span or perspectives on the life-span.

443. *Topical Seminar: Social Development*. II. 3 HR. (May be repeated for credit with consent.) Topical seminar on current issues in personality and socialization over the life-span or during selected periods of the life-span.

456. *Program Evaluation in Clinical Service*. I. (Alternate years) 3 HR. Examines the nature, method, and process of evaluative research, especially as it applies to social and behavioral treatment and service delivery programs.

464. *Family and Marital Therapy*. II. (Alternate Years) 3 HR. Examines both theoretical and practical aspects of the assessment and treatment of family and marital difficulties.

467. *Child Clinical Psychology Practicum*. I, II, S. 1-15 HR. (May be repeated for credit.) PR: Consent. Supervised field experience in various aspects of delivering psychological services directly or indirectly to children. Experience in assessment, treatment, program design, administration, and evaluation.

468. *Seminar in Child Clinical Psychology*. I or II. 1-3 HR. (May be repeated for credit with consent.) Current issues and research related to a particular area of clinical psychology involving children.

470. *Behavioral & Psychological Assessment 1*. I. 3 HR. Conceptual and methodological bases for behavioral assessment; comparison of trait-oriented versus behavioral assessment; design and evaluation of measurement systems, particularly self-report, ratings by others, and direct observation, within the basic framework of generalizability theory.

471. *Behavioral and Psychological Assessment 2*. II. 4 HR. PR: PSYC 470. Evaluation of clinically relevant behavior and environments by means of testing and other methods. Includes test selection, administration, and report writing.

477. *Adult Clinical Psychology Practicum*. I, II, S. 1-15 HR. (May be repeated for credit.) PR: Consent. Supervised practice of psychological techniques in clinics or institutional settings; experience in psychological testing, interviewing, report writing, case presentation, interpretation of tests and supportive counseling.

479. *Seminar in Clinical Psychology*. I or II. 1-3 HR. (May be repeated for credit with consent.) Research and problems in clinical psychology.

480. *Clinical Neuropsychology*. II. (Alternate years) 3 HR. Neuroanatomical foundations, neurobehavioral disorders, neuropsychological assessments, and psychopharmacological principles and practices relevant to clinical psychology.

481. *Psychophysiology*. II. (Alternate years) 3 HR. PR: 3 HR. of physiological psychology or consent. The current state of theory, methods, and findings concerning the association of physiological response systems and psychological states and processes, including biofeedback intervention.

482. *Adult Behavior Therapy*. II. 3 HR. Reviews the roots and development of behavioral interventions with adult populations. Applied clinical intervention is stressed in concert with evaluation and research application.

483. *Integrative Behavioral Psychotherapy*. II. (Alternate years) 3 HR. Conceptual and practical introduction to basic tenets, concepts, and techniques of major schools of psychotherapy. Reviews psychotherapy integration efforts by analyzing therapy process variables and therapist activities presumably common to many effective forms of therapy.

484. *Introduction to Clinical Psychopharmacology*. I. (Alternate years) 3 HR. Survey of the ways in which psychotropic drugs are used to treat behavioral and psychological disorders.

490. *Teaching Practicum*. I, II, S. 1-3 HR. (May be repeated for credit.) PR: Consent. Supervised practice in college teaching of psychology.

497. *Research*. (Dissertation). I, II, S. 1-15 HR. (May be repeated for credit.) PR: Consent.

Public Administration

David G. Williams, Chairperson of the Department

302-B Woodburn Hall P.O. Box 6322

Degree Offered: Master of Public Administration

The Department of Public Administration offers a public administration curriculum for graduate students seeking the degree of master of public administration (M.P.A.) or a specialization as part of another graduate degree program. This program provides a professional orientation to the primary facets of public management.

Curriculum

The master of public administration curriculum serves the needs of students from a variety of backgrounds who wish to pursue careers in public service. It directs particular attention to developing an understanding of the management function in the public context as well as preparation in utilizing advanced management techniques applicable to all levels of government—local, state, national, and international—as well as the not-for-profit sector, particularly health and hospital organizations.

The study program is designed to supply an academic foundation for comprehension of the range of processes and management approaches employed in public administration. These include public management theory and practice, personnel administration, budgetary and financial management, organizational dynamics, legal and ethical concerns, practically-oriented research, and leadership. Particular stress is placed on those functions and issues that require the greatest degree of adaptation, innovation, and responsiveness on the part of the professional administrator.

The curriculum reflects the diversity of skills required by all levels of government. The range of needs is broad in scope; students apply from diverse backgrounds, including political science, other social sciences, physical sciences, humanities, and from positions in public service, not-for-profit, and private sectors.

General Requirements

The M.P.A. degree requires the completion of 47 credit hours. The general requirements are listed below. These general requirements can be tailored to individual students' needs with revisions agreed upon by both student and advisor.

- Integrative seminar (two credit hours): Orientation to professional skills and program content (PA 300).
- Foundation courses (13 credit hours): Public management theory and practice (PA 310), public financial management (PA 320), methods for public administration research (PA 330), and legal and political foundations (PA 340).
- Advanced courses (nine credit hours): Public budgeting (PA 420), applied research in public administration (PA 430), and public personnel administration (PA 441).
- Elective courses (12 credit hours): Selections from a wide range of specialized public administration elective courses and elective courses offered in other fields.
- Internship (nine credit hours): Public administration internship (PA 403) and project paper (PA 404).
- Integrative seminar (two credit hours): Application of course concepts to planned change in public organizations (PA 452).

Degree Completion

It usually takes four semesters for full-time students to complete the M.P.A. degree. Course work can be completed in two semesters and a summer. In addition, the internship is generally one semester in length, although a variety of internship arrangements are possible. For those individuals who have had substantial public service experience, internship credit can be awarded.

Health Care Administration

Elective courses are offered in health care administration for students who desire to specialize in this area as part of the M.P.A. degree. A certificate program is also available. Check at the department for details.

Joint Degrees

The department has established both joint degree and double degree programs with a number of other graduate programs. A joint J.D./M.P.A. degree program has been established with the College of Law to provide preparation in both law and public administration. A joint M.S.W./M.P.A. degree has been developed with the cooperation of the School of Social Work to provide preparation for administrators in the social services. Double degree programs may also be arranged with other academic programs and professional schools. Graduate studies regulations permit limited credit from one graduate degree to be applied to a second degree. Students may pursue two degrees and use approved course work for both degrees.

Recommended Courses

While many tool skills are included in the required courses, it is strongly recommended that students take courses in accounting, statistics, and computer science as part of their undergraduate program. Course work may also be taken at the graduate level in these subjects (200 and above) and counted as elective hours.

Minor

A graduate minor in public administration may be taken in conjunction with other graduate degrees in the College of Arts and Sciences. In addition, a graduate minor in public administration may be part of graduate degree programs outside the College as approved by the graduate committee for that student.

At the master's level, a minor consists of 12 hours of course work (PA 310, 320, 340, and one advanced course). At the doctoral level, 15 hours of course work is required (PA 310, 320, 340, and two advanced courses). A grade-point average of 3.0 must be achieved for the courses taken in the graduate minor.

Changes in course requirements within the hour limits may be approved by the Department of Public Administration for students with specialized needs or background experience.

Admission

Candidates must meet the WVU general admission requirements for graduation from an accredited college and grade-point average. Admission into the M.P.A. program is competitive with decisions based on:

- Application for admission and transcripts (submitted to the Office of Admissions and Records).
- Three letters of evaluation (forms are available from chairperson of the Department of Public Administration), Graduate Record Examination scores for the aptitude test, and a vita. These materials should be submitted to the chairperson of the Department of Public Administration.

In the case of practicing administrators, a record of accomplishment in administrative performance will be weighed heavily in combination with the criteria outlined above.

Application Deadline

The deadline for fall or summer applications is April 1; Applicants will be notified around April 15; deadline for January admission is October 15; applicants will be notified around November 1. Decisions on applications will be made during these two periods, although late applications are considered if space is available.

Application forms and additional information may be obtained by contacting the chairperson of the Department of Public Administration.

Public Administration (PUBA)

300. *Professional Skills Seminar*. I, II, 2 HR. PR: Consent. Orientation and overview of public administration; M.P.A. program content and expectations; research resources and computer applications; professional development activities and public service.

310. *Public Management Theory and Practice*. I, II, S. 3 HR. Graduate level introduction to management theory and practice in the public sector, including contextual influences, administrative behavior and motivation, decision-making, leadership, organizational design, communication, and evaluation.

320. *Public Financial Management*. I, II, 3 HR. PR: Consent. Principles and practices of public sector financial management including management control concepts, governmental financial accounting and reporting, analytical and managerial techniques and microcomputer applications to public financial management.

330. *Methods for Public Administration Research*. I, II, 4 HR. PR: Consent. Introduction to the foundations and processes of applied research applicable to public administration, with emphasis upon data collection and analysis. Use of the personal computer for word processing and data analysis is also emphasized.

340. *Legal and Political Foundations*. I, II, 3 HR. PR: Consent. Constitutional-legal basis of American public administration; the policy making process; administrative agency relationships with executive, legislative and judicial branches; bureaucratic power and legitimacy; and administrative legal process.

345. *Public Administration and Policy Development*. II, 3 HR. Policy development examined in terms of values, process, specific policy cases, alternative "futures" analyses and policy science.

403. *Internship*. I, II, S. 3-9 HR. PR: Consent. A working internship in a government or public service related agency, designed to provide students with an opportunity to gain field experience, and to relate knowledge gained through course work situation. (Graded S or U.)

404. *Public Service Internship Analysis*. I, II, S. 3 HR. PR: PUBA 403, consent. Designed for students enrolled in PUBA 403. Students undertake in-depth analysis of elements of their internship (policy matters, organizational questions, administrative dilemmas, etc.) and prepare a written report.

410. *Administrative Behavior in Public Organizations*. I, 3 HR. Introduces and familiarizes the student with the nature of individual and group behavior in public organizations and bureaucratic settings.

411. *Public Planning*. II, 3 HR. Principles and practices of government planning including development and management of policy, political and economic context of strategic planning and social planning.

412. *Administrative Ethics and Justice*. I, 3 HR. PR: PUBA 310 or consent. Analysis of ethical issues in public administration. Study of the concepts of distributive and procedural justice and their applications to administrative decision-making.

420. *Public Budgeting*. I, II, 3 HR. PR: PUBA 320. Advanced study of public budgeting at the federal, state and local levels of government. Emphasis is placed on principles of public finance, budgeting processes and approaches; revenue sources and tax structures; and budget preparation and analysis.

430. *Applied Research in Public Administration*. I, II. 3 HR. PR: PUBA 330. Completion of an original, quantitative, applied research project dealing with issues and/or problems in the public sector.

431. *Information Management in Public Administration*. II. 3 HR. Concepts and practice of information management in the public sector; computer applications and their impact on organizational performance as well as public accountability, political and administrative constraints, ethics and privacy.

441. *Public Personnel Administration*. I, II, S. 3 HR. PR: Consent. Concept of merit and ideological roots of merit system; personnel functions in government with emphasis upon acquiring and managing human resources, equity, employee and executive development and problems of patronage, and employee relations.

443. *Public Employee Labor Relations*. II. 3 HR. PR: Consent. Provides overview of theory, structures, and issues of public-sector labor relations; specific knowledge and training in processes and behaviors of contract negotiation and contract maintenance; and introduction to conflict management in non-unionized settings.

452. *Capstone Seminar: Strategies for Change*. I, II. 2 HR. PR: Consent. Develops knowledge base and techniques for using Public Administration concepts gained in the curriculum to effect planned change in organizations and cope with its ethical implications.

491. *Advanced Study*. I, II, S. 1-6 HR. PR: Consent. Focuses on those subjects of most topical concern in public administration.

492. *Directed Study*. I, II, S. 1-6 HR. PR: Consent. Directed study, reading and/or research.

493. *Special Topics*. 1-6 HR.

494. *Special Seminar: (topic)*. II. 1-6 HR. Special seminars arranged for advanced graduate students.

495. *Independent Study*. 1-6 HR.

Religious Studies (RELG)

Religious Studies courses may be taken for University LSP credit (except RELG 290 and 491) or for elective credit. Also, an Interdepartmental major in Religious Studies may be undertaken.

290. *Seminar: Selected Topics*. 3 HR. PR: A previous religious studies course or consent.

391. *Advanced Topics*. 1-6 HR.

397. *Research*. 1-15 HR.

490. *Teaching Practicum*. 1-3 HR.

491. *Advanced Study*. 1-6 HR.

492. *Directed Study*. 1-6 HR.

493. *Special Topics*. 1-6 HR.

494. *Special Seminars*. 1-6 HR.

495. *Independent Study*. 1-6 HR.

496. *Graduate Seminar*. 1 HR.

497. *Research*. 1-15 HR.

498. *Thesis*. 2-4 HR.

499. *Graduate Colloquium*. 1-6 HR.

Sociology and Anthropology

Ronald Althouse, Chairperson of the Department
423 Hodges Hall

Degree Offered: Master of Arts

The Department of Sociology and Anthropology offers an emphasis in applied social research leading to the degree of master of arts. Students are trained to be able to take positions in government, universities, community agencies, and private industry that require them to design and conduct research for purposes of evaluating policies and programs, documenting social needs, monitoring service delivery, and marketing products and services. The program also serves as a good foundation for students who may later choose to pursue doctoral studies.

Admission

Applicants for admission to graduate study must have a bachelor's degree from an accredited institution. Applicants should have their college or university transcripts sent directly to the WVU Office of Admissions and Records. Candidates should also submit three completed "Recommendation Forms" from former professors, supervisors, or employers. Applicants should submit a written statement of why they are interested in the program and in a career in applied social research. An on-campus interview in the department is encouraged. Scores for the Graduate Record Examination are not essential for admission but must be provided before the beginning of classes. Foreign students for whom English is not the native language are required by the University to submit *Test of English As a Foreign Language* (TOEFL) scores (a minimum score of 550 is required) and may be required to participate in the University's language orientation sessions.

Application Deadline

Application should be completed by March 1 for admission to the fall semester. **Students seeking financial assistance must request and submit a separate application form furnished by the department.**

Remediation

Students with deficient background in sociological theory or methods may be required to do remedial work. Full-time students who are admitted as special provisional students are required to complete 12 hours of approved course work with a B average or better within a year; students who fail to do so are suspended. The department graduate committee assesses all students and determines who will be permitted to continue in the program, with or without assistance. Normally, assistance is for no more than two years.

Degree Requirements

The 36 hour program requires 30 hours of course work and either the completion of an applied research report (six hours) based on an analysis of a social program or policy, or a master's thesis (six hours) for students interested in investigating a theoretical problem or methodological issue. During the first three semesters, students are required to enroll in a series of core research courses. These include survey research methods, qualitative research methods, elementary and advanced data analysis, principles of research design, and a seminar in applied social research policy.

Options

The thesis may consist of an empirical assessment of community needs, problems, policies, and/or programs or an analysis of a problem in the social scientific literature. The student, in consultation with his/her program committee, chooses electives either in the department or elsewhere in the University as a basis for gaining expertise in some specific area of concentration.

Faculty

In addition to instruction in technical skills, faculty furnish an overview of the relationship between policy and research and provide expertise in a broad range of substantive areas, including economic development in Appalachia; gender, racial, and ethnic studies; the sociology of education and work; criminal justice system; health care delivery; injury prevention; community and organizational development; and conflict analysis and resolution.

Bachelor of Arts/Master of Arts

This special option is available to WVU undergraduate sociology and anthropology majors with a grade-point average of 3.0. By taking nine hours of specified graduate work as elective credit during the senior year, students can complete a 30-credit M.A. in only one year of full-time study. However, students cannot hold an assistantship and still complete the degree in one year. Contact the department chairperson for more details.

Sociology and Anthropology (SOCA)

201. *Sociological Theory*. II. 3 HR. PR: 6 HR. SOCA and senior standing or consent. Systematic analysis of major sociological theories viewed from the historical perspective and in terms of current research.

204. *Complex Organizations*. I. 3 HR. PR: 6 HR. SOCA or consent. The structure and functioning of large-scale, bureaucratic organizations, including studies of industrial organizations, prisons, hospitals, government bureaus, and the military in contemporary society.

205. *Class, Status, and Power*. I or II. 3 HR. PR: 6 HR. SOCA or consent. Analysis of various systems of social inequality. Emphasis on empirical studies describing social class system, distribution of status and power, and patterns of social mobility in America.

211. *Social Research Methods*. I, II. 3 HR. PR: SOCA 1 or 5 or consent. Logic of social research, elements of research design, and problems of measurement, with emphasis on survey research methodology and data analysis.

222. *Community Development*. II. 3 HR. PR: SOCA 122, or 6 hrs. SOCA, or consent. Application of sociological knowledge of structure of communities for planning programs and services. Emphasis on techniques of organizing efforts for community change in developing nations.

223. *Sociology of Rural Life*. I or II. 3 HR. PR: SOCA 1 or consent. Social aspects of rural living. Characteristics of rural population, social structure, and institutional arrangements: family, community, education, religion, recreation, health, welfare, and local government.

230. *The Criminal Justice System*. II. 3 HR. PR: SOCA 132 or consent. A sociological introduction to the criminal justice system. Analysis of police work, court activities, and corrections within the context of American social organization and societal definitions of crime and justice.

231. *Sociology of Law*. I or II. 3 HR. PR: Senior standing and permission of instructor. Development and practice of law as part of social systems; theoretical treatments of the relationship between law and social order; emphasis on issues of class, race, and gender. 3 HR. lec.

232. *Sociology of Education*. I. 3 HR. PR: SOCA 1 or consent. Education as a social institution, cultural and class influences on education, social roles and career patterns in the school system, the school and problems of the community. (Also listed as EdF 300.)

233. *Sociology of Work and Work Places*. I or II. 3 HR. PR: SOCA 1 or consent. Explores the significance of work and work relations in contemporary society. Emphasis is given to the analysis of employment settings including industrial organizations.

253. *Religion, Magic, and Healing*. I or II. 3 HR. PR: 6 HR. SOCA or consent. Symbolism, magic, ritual, shamanism, sorcery, and concepts of sin and salvation related to peasant and tribal cosmologies will be examined as causes of and remedies for suffering in traditional and modern contexts.

258. *Anthropology of Health and Illness*. 3 HR. PR: 6 HR. SOCA or Consent. Health and Disease, diagnosis, and healing in cross-cultural perspectives; analyses of social, cultural, political, and economic factors in modern and traditional medical systems.

261. *Issues in Crime and Justice*. I or II. 3 HR. PR: Consent. Senior seminar on crime and the social organization of justice. Special focus on problems of professionals in prevention, enforcement, corrections, and institutional reform. Emphasis on recent research, emerging trends, and key policy choices.

290. *Special Topics*. I, II, S. 1-3 HR. PR: 6 HR. SOCA or consent. Topics change so students may enroll more than once.

291. *Honors Seminar*. I or II. 1-3 HR.

293. *Independent Study*. I, II, S. 1-6 HR. per sem. PR: 3.0 grade-point average and written departmental permission. Directed reading or research for students desiring work not available in regular course offerings.

311. *Survey Research Methods*. I. 3 HR. PR: SOCA 211 and STAT 101 or consent. Provides students with an overview of survey research including problem definition, research design, sampling, measurement, instrument construction, project management, ethical considerations, and report writing.

313. *Qualitative Methods*. I or II. 3 HR. Provides students with supervised field experiences in interviewing, participant observation, and other methods of qualitative data gathering, analysis, and presentation.

317. *Data Analysis*. II. 3 HR. PR: STAT 101 or equiv. Using social science survey data, this course integrates statistics, computer usage, and social science theory to examine alternative methods of analyzing social science data. Makes extensive use of SPSS software package.

318. *Data Analysis*. I. 3 HR. PR: SOCA 317. Continuation of SOCA 317.

319. *Microcomputer Applications*. I. 1 HR. A directed tutorial in selected social science applications of microcomputer use with emphasis on production of research reports. (SOCA majors only.)

322. *Contemporary Sociological Theory*. II. 3 HR. Review of recent trends and orientations in sociology. Theory construction, topologies, mathematical models, and the relationship between theory and research. Review of current literature.

390. *Special Topics*. I, II. 1-3 HR. A graduate course offered as the need arises. Topics change so students may enroll more than once.

391. *Seminar*. I, II. 3-9 HR.

393. *Independent Study*. I, II, S. 1-9 HR. PR: Written departmental consent. Directed reading and/or research in a specialized area of interest.

394. *Thesis or Applied Problem Research*. I, II, S. 6 HR.

395. *Field Work*. I, II, S. 1-6 HR. PR: Departmental consent. Supervised field work.

490. *Teaching Practicum*. I, II. 1-3 HR.

497. *Research*. I, II, S. 1-15 HR.

Statistics

E. James Harner, Chairperson of Department
207 Knapp Hall

Degree Offered: Master of Science

The Department of Statistics offers a master of science with a major in statistics. The Department also offers a minor in statistics as an option for both master of science and doctor of philosophy Eberly College of Arts and Sciences degree programs. The master of science degree is intended to qualify the student to assume a professional role in an educational, industrial, or governmental research project; to teach in a college; or to undertake advanced training toward a doctorate in statistics or one of the quantitative fields of science.

Because many students receive baccalaureate degrees from colleges which do not offer undergraduate programs in statistics and because historically statistics has been primarily a field of graduate education, a student does not need a degree in statistics to enter the M.S. degree program in statistics. A good background in mathematics, science, or engineering is reasonable preparation for graduate work in statistics.

Master of Science

Options The following two options are available for students seeking a master of science in statistics:

- Problem Report Option—at least 36 hours of course work including three hours of credit for a problem report;
- Thesis Option—at least 36 hours of course work including six hours of credit for a thesis.

Prerequisites Students are expected to know the material contained in the following courses or areas upon admission to the program. Otherwise, these deficiencies must be removed as early as possible in the student's degree program under the terms specified by the Admissions and Standards Committee.

- Single and multivariable calculus (MATH 15, 16, 17 or equiv.);
- Linear or matrix algebra (MATH 241 or equiv.);
- Probability and statistics (STAT 201 or equiv.);
- Knowledge of a high-level programming language.

Required Courses Minimum requirements for either option are:

- STAT 312, 313, 351, 361, 362;
- Nine hours from STAT 331, 341, 381, 385, 451;
- STAT 390, 392, 396, 397.

Credit towards the degree requirements is not given for STAT 311. Students must complete at least one hour of credit for STAT 390, 392, and 396 and at least three hours of credit for STAT 397. Students are expected to attend the graduate seminar every semester even if they are not registered for STAT 396. A grade of C or better and a minimum 2.75 GPA is required for courses fulfilling a major in statistics.

Examinations Students must pass two written comprehensive examinations on foundation material and a final oral examination on the thesis or problem report. One comprehensive examination covers the theory taught in STAT 361 and 362; the other covers the applications taught in STAT 312, 313, and 351. These written examinations are normally given in the first four weeks of the semester in which the student expects to graduate. The final oral examination is a defense of the graduate research project

required of all students, and it is usually given within four weeks after the student has presented an acceptable copy of the thesis or report to the advisor and graduate committee.

More information concerning graduate studies may be found in *Graduate Programs in Statistics* available from the Department of Statistics.

Minor in Statistics

Master's Level Any student pursuing a master's degree in the Eberly College of Arts and Sciences may complete a minor in statistics by completing one of the following options:

Minor in Applied Statistics

- Knowledge of a high-level programming language;
- Nine hours from STAT 312, 313, 331, 341, 351, 361, 362, 381, 385, 451.

A grade of C or better and a minimum 2.75 GPA is required for courses fulfilling a minor in statistics. A statistics faculty member must be on the student's graduate committee. The student must make a significant application of statistics in his/her problem report/thesis or demonstrate the ability to apply statistical techniques to a research problem.

Minor in Mathematical Statistics

- MATH 15, 16, 17, and knowledge of a high-level programming language;
- STAT 361, 362;
- Six hours from STAT 312, 313, 331, 341, 351, 381, 385, 451.

A grade of C or better and a minimum 2.75 GPA is required for courses fulfilling a minor in statistics.

Doctoral Level A student pursuing a doctor of philosophy in the Eberly College of Arts and Sciences may complete a minor in statistics by completing one of the following options:

Minor in Applied Statistics

- MATH 15, 16 and knowledge of a high-level programming language;
- Fifteen hours from STAT 312, 313, 331, 341, 351, 361, 362, 381, 385, 451.

A grade of C or better and a minimum 3.0 GPA is required for courses fulfilling a minor in statistics. A statistics faculty member must be on the student's graduate committee. Statistics must be one of the areas covered in the student's comprehensive examination.

Minor in Mathematical Statistics

- MATH 15, 16, 17, and knowledge of a high-level programming language;
- STAT 361, 362;
- Nine hours from STAT 312, 313, 331, 341, 351, 381, 385, 451.

A grade of C or better and a minimum 3.0 GPA is required for courses fulfilling a minor in statistics. A statistics faculty member must be on the student's graduate committee. Statistics must be one of the areas covered in the student's comprehensive examination.

Statistics (STAT)

201. *Introduction to Probability and Statistics*. I, II, S. 3 HR. PR: MATH 16. Probability, random variables, discrete and continuous probability distributions, joint probability distributions, expected value. The central limit theorem. Point and interval estimation and tests of hypotheses. Chi-square tests, linear regression, and correlation.

205. *Introductory Probability and Statistical Inference*. I. 3 HR. PR: MATH 128 or equiv. Probability, random variables, expectation, random sampling, descriptive statistics, sampling distributions, estimation, hypothesis testing, linear regression, nonparametric statistics.

212. *Intermediate Statistical Methods*. I, II. 3 HR. PR: STAT 101 or STAT 201 or equiv. Extension of basic concepts of statistical inference: estimation and hypothesis testing for more than two populations, multiple regression and correlation, curvilinear regression, analysis of variance and covariance.

213. *Introductory Design and Analysis*. II. 3 HR. PR: STAT 212. Introduction to the linear model, the complete and fractional factorial experiment, and the completely random, randomized complete block, Latin square, and split-plot experimental designs.

221. *Statistical Analysis System (SAS)*. I. 3 HR. PR: STAT 101 or STAT 201 or equiv. and CS 15 or equiv. Introduction to the use of the Statistical Analysis System (SAS), a statistical computer program. Students will perform statistical data analysis, data file modifications, and statistical report writing.

231. *Sampling Methods*. I. 3 HR. PR: STAT 101 or 201 or equiv. Methods of sampling from finite populations, choice of sampling unit and sample survey design. Estimation of confidence limits and optimum sample size. Single and multistage sampling procedures.

251. *Data Analysis*. I. 3 HR. PR: STAT 212 or equiv. Computer analyses of simulated or real unbalanced data using a matrix approach to linear models. The techniques will include: least squares analysis of variance and covariance; multiple and polynomial regression; multiple discrimination.

261. *Theory of Probability*. I. 3 HR. PR: MATH 17. Theoretical coverage of probability, random variables, discrete and continuous probability distributions. Expected value, moment generating functions, special probability distributions. Random sampling and distributions of certain functions of random variables. The Central Limit Theorem.

262. *Theory of Statistics*. II. 3 HR. PR: STAT 261. Theoretical introduction to statistical inference. Properties of estimators and techniques of estimation. Hypotheses testing including the Neyman-Pearson Lemma and likelihood ratio tests. Regression and correlation. Selected topics.

291. *Topics in Statistics*. I, II, S. 3 HR. PR: STAT 201 or equiv. Advanced study of topics in statistics.

305. *Foundations of Probability and Statistics*. S. 3 HR. PR: MATH 16 or consent. Probability, random variables, discrete and continuous probability distributions, point and interval estimation, chi-square tests, linear regression, and correlation.

311. *Statistical Methods 1*. I, II, S. 3 HR. PR: MATH 3. Statistical models, distributions, probability, random variables, tests of hypotheses, confidence intervals, regression, correlation, transformations, F and Chi-square distributions, analysis of variance and multiple comparisons. (Equiv. to ED.P. 311 and PSYC 311.)

312. *Statistical Methods 2*. I, II, S. 3 HR. PR: STAT 311 or equiv. Completely random, randomized complete block, Latin square and split-plot experimental designs. Unplanned and planned multiple and orthogonal comparisons for qualitative and quantitative treatments and factorial arrangements. Multiple linear regression and covariance analysis. (Equivalent to EDP 312 and PSYC 312.)

313. *Design of Experiments*. II. 3 HR. PR: STAT 312 or equiv. Expected mean squares, power of tests and relative efficiency for various experimental designs. Fixed, random, and mixed models. Use of sub-sampling, covariance and confounding to increase power and efficiency.

331. *Sampling Theory and Methods*. I. 3 HR. PR: STAT 311 or equiv. Survey components, methods of sampling for finite and infinite populations, single and multi-stage procedures, confidence limits for estimating population parameters; sample size determination, area sampling, sources of survey error, a "hands-on" project in survey sampling is included.

341. *Applied Multivariate Analysis*. II. (Alternate years.) 3 HR. PR: STAT 311 or equiv. Introduction to Euclidean geometry and matrix algebra; multiple and multivariate regression including multiple and canonical correlation; the k-sample problem including discriminant and canonical analysis; and structuring data by factor analysis, cluster analysis, and multidimensional scaling.

351. *Applied Regression Analysis*. I. 3 HR. PR: STAT 312 or equiv. Matrix approach to linear and multiple regression, selecting the "best" regression equation, model building, and the linear models approach to analysis of variance and analysis of covariance.

361. *Theory of Statistics 1*. I. 3 HR. PR: MATH 17. Probability and random variables, univariate and multivariate distributions, expectations, generating functions, marginal and conditional distributions, independence, correlation, functions of random variables including order statistics, limiting distributions, and stochastic convergence.

362. *Theory of Statistics 2*. II. 3 HR. PR: STAT 361. Techniques of point and interval estimation, properties of estimates including bias, consistency, efficiency, and sufficiency; hypothesis testing including likelihood ratio tests and Neyman-Pearson Lemma; Bayesian procedures, analysis of variance and nonparametrics.

371. *Introduction to Exploratory Data Analysis*. I. (Alternate years.) 3 HR. PR: An introductory statistics course. Basic ways in which observations given in counted and measured form are approached. Pictorial and arithmetic techniques of display and discovery. Methods employed are robust, graphical, and informal. Applications to social and natural sciences.

381. *Nonparametric Statistics*. II. (Alternate years.) 3 HR. PR: STAT 311 or equivalent. Distribution-free procedures of statistical inference. Location and scale tests for homogeneity with two or more samples (related or independent); tests against general alternatives.

385. *Categorical Data Analysis*. II. (Alternate years.) 3 HR. PR: STAT 201 or equiv. Bivariate association for ordinal and nominal variables, models for categorical or continuous responses as a special case of generalized linear models, methods for repeated measurement data, exact small-sample procedures.

390. *Teaching Practicum*. I, II. 1-3 HR. PR: Consent. Supervised practice in college teaching of statistics.

391. *Advanced Studies in Statistics*. I, II, S. 1-6 HR. PR: Consent. Investigation in advanced statistics subjects which are not covered in regularly scheduled courses. Study may be independent or through specially scheduled lectures.

392. *Analysis of Experiments*. I, II, S. 1 HR. PR: Consent. Statistical consulting and data analysis.

396. *Graduate Seminar*. I, II. 1 HR. PR: Consent. Each graduate student will present at least one seminar to the assembled faculty and student body in statistics.

397. *Research in Statistics*. I, II, S. 1-15 HR. PR: Consent.

441. *Multivariate Statistical Theory*. II. (Alternate years.) 3 HR. PR: STAT 341, 361 or consent. Euclidean vector space theory and matrix algebra, multivariate normal sampling theory, the theory of the multivariate general linear hypothesis including multivariate regression, MANOVA, and MANCOVA, and the theory of factor analysis.

451. *Linear Models*. II. (Alternate years.) 3 HR. PR: STAT 351, 362 or consent. Multivariate normal distribution, distribution of quadratic forms, linear models, general linear hypotheses, experimental design models, components of variance for random effects models.

Center for Women's Studies

Helen M. Bannan, Director

218 Eiesland Hall

The Center for Women's Studies has a university-wide mission to coordinate interdisciplinary teaching and research on women and gender. The Center sponsors lectures, films, colloquia, symposia, conferences, faculty development programs, and scholarships. A resource library in the Center supplements the women's studies holdings of other campus libraries. The Center is supported by the West Virginia Alliance for Women's Studies, a community-based group that promotes women's studies and women's education throughout the state.

Although there is currently no independent graduate degree in women's studies available at West Virginia University, students interested in doing graduate work in women's studies can apply for admission to the master of arts in liberal studies program (M.A.L.S.), offered through the Eberly College of Arts and Sciences. This interdisciplinary program provides an opportunity for students to develop their course work and project in the framework of women's studies scholarship. Interested students should become familiar with the requirements of M.A.L.S. as described on page 163 and contact the M.A.L.S. director before contacting the Center.

Undergraduate Certificate in Women's Studies

Students can also choose to complete an undergraduate certificate in women's studies in conjunction with the M.A.L.S. degree or any other graduate degree. The certificate, a 19-hour program with two required and four elective courses, allows the student to design an individualized certificate or choose to focus on an area of concentration such as Women's Literature or Women's Health and Sexuality. The certificate constitutes a valuable credential in a variety of careers necessitating an understanding of women's issues. To enroll in the certificate program, students must register with the Program Specialist in the Center for Women's Studies.

Financial Assistance

Some financial assistance is available to students doing graduate work in women's studies. Two scholarships are available to students doing graduate course work or research in women's studies, the Winifred South Knutti Graduate Scholarship in Women's Studies and the Velma M. Miller Women's Studies Graduate Scholar Award. Teaching assistantships may also be available.

For more information, visit the Center's web site at <http://www.as.wvu.edu/wmst/> or contact the Center for Women's Studies, 218 Eiesland Hall, PO BOX 6450, Morgantown, WV 26506-6450. Email wwwmst@wvu.edu Telephone (304) 293-2339.

In addition to the women's studies courses listed below, other courses focusing on women and gender as well as independent study opportunities are available in several university departments.

Women's Studies (WMST)

240. *Methods and Perspectives in Women's Studies*. I, II. 4 HR. PR: 9 HR. in approved women's studies courses and junior standing, or consent. An exploration of major theoretical perspectives on and research methods appropriate to the interdisciplinary study of women and gender.

290. *Independent Study*. I, II, S. 1-6 HR. PR: Consent. Individual study of an interdisciplinary issue in women's studies and/or gender studies.

350. *Sexuality in American Culture*. II. 3 HR. Explores changes in sexuality in the United States from the seventeenth century to the present, examining social and cultural struggles and debates over the meaning of sexuality and sexual orientation in American society. Analyzes research methodologies appropriate to this field. (Credit cannot be received for both 150 and 350.)

391. *Advanced Topics*. I, II, S. 1-6 HR. PR: Consent. Investigation in advanced Women's Studies Topics. Study may be independent or through scheduled meetings.

397. *Research*. I, II, S. 1-9 HR. PR: Consent.

490. *Teaching Practicum*. I, II. 1-3 HR. PR: Consent. Supervised practice in college teaching of Women's Studies.

491. *Advanced Study*. I, II. 1-6 HR. PR: Consent. Investigation in advanced Women's Studies topics. Study may be independent or through scheduled meetings.

492. *Directed Study*. 1-6 HR.

493. *Special Topics*. 1-6 HR.

494. *Special Seminars*. 1-6 HR.

495. *Independent Study*. 1-6 HR.

496. *Graduate Seminar*. 1 HR.

497. *Research*. 1-15 HR.

498. *Thesis*. 2-4 HR.

499. *Graduate Colloquium*. 1-6 HR.

College of Business and Economics

Sydney V. Stern, Ph.D., Dean

Tom S. Witt, Ph.D., Associate Dean

Richard M. Gardner, M.B.A., Assistant Dean

Susan Gustin, M.A., Assistant Dean

Paul J. Speaker, Ph.D., Coordinator of Graduate Programs

The College of Business and Economics was founded in November of 1951 and graduated its first class in the spring of 1953. Since that time, the College of Business and Economics has become one of the largest colleges at West Virginia University. In 1954, the College became fully accredited by the American Assembly of Collegiate Schools of Business, the highest level of business accreditation.

In 1990, the new College of Business and Economics building was completed on the site of Old Mountaineer Stadium on the Downtown Campus adjacent to historic Woodburn Hall. The four-story facility houses modern classrooms, two auditoriums, state-of-the-art computer laboratories, and space for the College's research and service centers.

Our mission centers around educating students to prepare them for professional careers in business, industry, government, and education. The College administration and faculty work with the WVU Career Services Center and private employers to place our graduates in rewarding professional positions.

The master of arts and doctor of philosophy degrees in economics prepare students for careers in business, government, and higher education. Students receive in-depth education in the concepts and methods of economic analysis and also study business analysis, public policy, mathematical economics, labor economics, resource economics, public finance economics, regional and urban economics, monetary economics, international economics, and econometrics. These programs are well-suited to students with undergraduate degrees in economics, finance, mathematics, statistics, public policy, history, and other humanities majors.

The master of business administration program is especially attractive for the student with a non-business undergraduate major since no business courses are prerequisite for admission. Course work includes an even exposure to all of the functional areas of management and provides a broad, general management orientation. The M.B.A. program is also available part time on evenings or weekends at various locations throughout West Virginia.

The master of science program in industrial relations provides a flexible, interdisciplinary education for the student desiring a career in human resources management (industrial relations). All undergraduate majors are acceptable. Areas of study may include the functional areas of business, counseling, law, safety, and others.

The master of professional accountancy program is available to students with undergraduate degrees in accounting. The program follows the AICPA's recommendations for a five-year accounting education and meets the requirements of all states with 150-hour requirements for CPA certification. The master's programs can be completed by a full-time student in one to one and a half years. Specific information about graduate programs in the College of Business and Economics may be obtained from Office of Graduate Programs, 333 Business and Economics Building, P.O. Box 6025, West Virginia University, Morgantown, WV 26506-6025. Telephone (304) 293-5408.

Graduate Programs

Business Administration	M.B.A.
Economics	M.A., Ph.D.
Industrial Relations	M.S.
Professional Accountancy	M.P.A.

Overview of Programs

The M.A. and Ph.D. degrees in economics prepare students for careers in business, government, and higher education. Students receive in-depth education in the concepts

and methods of economic analysis and also study business analysis, public policy, mathematical economics, labor economics, resource economics, public finance economics, regional and urban economics, monetary economics, international economics, and econometrics. These programs are well-suited to students with undergraduate degrees in economics, finance, mathematics, statistics, public policy, history, and other humanities majors.

The M.B.A. program is especially attractive for the student with a non-business undergraduate major since no business courses are prerequisite for admission. Course work includes an even exposure to all of the functional areas of management and provides a broad, general management orientation. The M.B.A. program is also available part time on evenings or weekends at various locations throughout West Virginia.

The master of science program in industrial relations (M.S.I.R.) provides a flexible, interdisciplinary education for the student desiring a career in human resources management (industrial relations). All undergraduate majors are acceptable. Areas of study may include the functional areas of business, counseling, law, safety, sociology, and others.

The master of professional accountancy (M.P.A.) program is available to students with undergraduate degrees in accounting. The program follows the AICPA's recommendations for a five-year accounting education and meets the requirements of all states with 150-hour requirements for C.P.A. certification. The master's programs can be completed by a full-time student in one year.

Special Requirements

The M.B.A., M.P.A., and M.S. in industrial relations and the M.A. and Ph.D. in economics programs require a bachelor's degree from an accredited institution. Overall grade point average is considered, with additional attention given to the grade point average achieved in the last sixty hours of course work. The Graduate Management Admissions Test (GMAT) is required for all of the business graduate programs. For the MSIR program, the Graduate Record Examination (GRE) may be substituted for the GMAT. The economics programs require the GRE. A resume is a requirement of the admission process for all programs.

Graduate Faculty

† Indicates regular membership in the graduate faculty.

* Indicates associate membership in the graduate faculty.

Accounting Professors

*Jay H. Coats, Ph.D. (U. Pitt.). Cost/managerial accounting, Microcomputers in accounting, Accounting education.

†Scott I. Jerris, Ph.D. (Purdue U.). Financial accounting, Accounting theory, Capital markets.

*Robert S. Maust, M.S. (WVU). CPA. Financial accounting, Accounting theory, Managerial and cost accounting.

*Adolph A. Neidermeyer, Ph.D. (U. Iowa). Federal and state income taxation, Estate planning, Financial accounting.

†David B. Pariser, Ph.D. (So. Ill.). CPA, CMA, CCA, CGFM. Financial accounting, Governmental accounting and auditing, Public sector accounting, International accounting.

†Ann B. Pushkin, Ph.D. (VPI&SU). CPA. Auditing, EDP auditing, Accounting information systems, Microcomputer applications.

*Gail A. Shaw, Ph.D. (U. Mo.). CPA, Financial accounting theory, Auditing, Business combinations.

†G. Stevenson Smith, Ph.D. (U. Ark.). CPA, CMA, CCA. Not-for-profit and governmental accounting, Cost accounting, Managerial accounting.

Associate Professor

†Richard C. Brooks, Ph.D. (LSU). CGFM. Managerial accounting, Governmental accounting, Public sector accounting.

*Bonnie W. Morris, Ph.D. (U. Pitt.). CPA. Accounting information systems, Expert systems and artificial intelligence, Internal auditing.

Assistant Professors

*Timothy A. Pearson, Ph.D. (U. Wisc.). CPA. Auditing, Financial accounting, Microcomputer applications.

Economics

Professors

- †Donald R. Adams, Jr., Ph.D. (U. Penn.). American economic history, European economic history, Economic development.
- †Luc E. Anselin, Ph.D. (Cornell U.). Regional economics, Econometrics.
- †Ronald J. Balvers, Ph.D. (U. Pitt.). Financial economics, Macroeconomic theory.
- †Clifford B. Hawley, Ph.D. (Duke U.). Labor economics, Microeconomic theory, Econometrics.
- †Ming-jeng Hwang, Ph.D. (Tex. A&M U.). General theory, Urban and regional economics, Mathematical economics.
- †Andrew W. Isserman, Ph.D. (U. Penn.). Regional economics.
- †Kern O. Kymn, Ph.D. (U. Chicago). General theory, Mathematical economics, Econometrics.
- †Patrick C. Mann, Ph.D. (Ind. U.). Utility economics, Industrial organization.
- †Douglas Mitchell, Ph.D. (Princeton U.). Monetary theory, Macroeconomic theory.
- †William S. Reece, Ph.D. (Wash. U.—St. Louis). Public economics.
- †Tom S. Witt, Ph.D. (Wash. U.—St. Louis). Econometrics, Energy economics, Regional economics.

Adjunct Professors

- †Walter C. Labys, Ph.D. (Nottingham U.). Adjunct. Commodity market modeling, Mineral economics, Econometrics.
- †Tim T. Phipps, Ph.D. (U. Cal. Davis). Agricultural economics, Resource economics.

Associate Professors

- †Brian J. Cushing, Ph.D. (U. Md.). Urban and regional economics, Econometrics, Public finance.
- †Stratford M. Douglas, Ph.D. (UNC). Econometrics, Industrial organization, Corporate finance.
- †William Trumbull, Ph.D. (UNC). Public finance, Law and economics, Applied microeconomics.

Adjunct Associate Professor

- †Victor K. Chow, Ph.D. (U. Ala.). Corporate finance, Portfolio management, Microeconomics.

Assistant Professors

- *Subhayu Bandyopadhyay, Ph.D. (U. Md.). International trade, International finance.
- *Sudeshna Bandyopadhyay, Ph.D. (U. Md.). Labor economics.
- *Eun-Soo Park, Ph.D. (Northwestern U.). Microeconomic theory, Game theory.
- †Russell S. Sobel, Ph.D. (Fla. St. U.). Public finance.

Finance

Professors

- †William B. Riley, Ph.D. (U. Ark.). Investments, Capital markets.
- †Frederick C. Scherr, Ph.D. (U. Pitt.). Corporate finance, Capital markets.

Associate Professors

- †Ashok Abbott, Ph.D. (VPI&SU). Financial institutions, Corporate finance, Mergers and acquisitions.
- †Victor Chow, Ph.D. (U. Ala.). Corporate finance, Portfolio management.
- †Karen C. Denning, Ph.D. (U. Pitt.). Corporate finance, Speculative markets, Economic regulation.
- †Terry L. Rose, Ph.D. (U. of Ill.). Insurance, Risk management.
- †Paul J. Speaker, Ph.D. (Purdue U.). Financial institutions, Modeling, Uncertainty.

Assistant Professors

- Heather Mulburt, Ph.D. (Penn State U.). Corporate Finance, Insurance.

Management and Industrial Relations

Professors

- *Neil S. Bucklew, Ph.D. (U. Wisc.). Past President. Industrial relations, Collective bargaining, Labor-management relations.
- †Randyl D. Elkin, Ph.D. (Iowa St. U.). Collective bargaining, Arbitration, Health care bargaining.
- †Jack A. Fuller, Ph.D. (U. Ark.). Heuristic decision making, Production planning and control, Systems analysis and design.
- †Ali H. Mansour, Ph.D. (U. Ga.). Management information systems, Management science, Production operations management.
- †Dietrich Schaupp, D.B.A. (U. Ky.). Organizational performance and development, Labor-management cooperation.

Associate Professors

- †Gerald L. Blakely, Ph.D. (UNC). Human resource management, Organizational behavior.
- †James Denton, Ph.D. (Kent St. U.). Decision science, Operations management.
- *John Harpell, D.B.A. (Ga. St. U.). Operations research, Mentorship, Production management.
- †Robert H. Moorman, Ph.D. (Ind. U.). Human resource management, Organizational behavior.
- *Wilbur J. Smith, M.S. (U. Wisc.). Human resource economics, Employment and training programs, Labor force.
- *Owen A. Tapper, M.S. (U. Wisc.). Trade unionism, Safety and health, Labor-management cooperation.

Assistant Professor

*Kunal Banerji, (U. Ky.). International business, Policy and strategy.

Annette Ranft, Ph.D. Policy and strategy.

*Monika Renard, Ph.D. (U. Md.). Human resource management.

William Spangler, Ph.D. (U. Pitt.). Management information systems.

Marketing

Professors

*Cyril M. Logar, D.B.A. (Kent St. U.). Health care marketing, Strategic marketing and planning, Marketing research.

Associate Professors

*Paula F. Bone, Ph.D. (U. So. Car.). Consumer behavior, Marketing research, Public policy.

*Robert W. Cook, D.B.A. (Kent St. U.). Sales management, Product management, Marketing strategy and planning, Retail management.

*Robert Corey, Ph.D. (Penn. St. U.). Channels of distribution, New product development, Direct marketing, Retail management, Business ethics.

*Karen R. France, Ph.D. (U. Pitt.). Health care and service marketing, Consumer research, Advertising strategy.

*Thomas Ponzurick, D.B.A. (Memphis St. U.). Health care and services marketing, International marketing, Strategic marketing research.

Accountancy, Professional

Gail Allan Shaw, Coordinator

333 Business and Economics Building

Degree Offered:

Master of Professional Accountancy

Given the changing environment in both the public and private sectors of the economy, many accountants will need an educational background that goes beyond that obtained in an undergraduate degree program. Accountants must be proficient in applying professional concepts and principles to a wide variety of existing situations and also have the ability to adapt to new standards and methods of doing business. Competing in such an environment requires a solid technical foundation, an adeptness in analyzing multifarious business situations, and the aptitude to effectively communicate recommended solutions and conclusions. Thus, the objectives of the master of professional accountancy degree are as follows:

- Enhancement of the knowledge base acquired in an undergraduate accounting program with respect to professional concepts, standards, and principles and the ability to apply them.
- Development of higher level critical thinking, problem solving, and other creative skills beyond those attributable to undergraduate education.
- Enhancement of an understanding of ethical, legal, and regulatory issues with respect to business decisions.
- Continued development of an awareness of the impact of the global environment on business decisions.
- Enhancement of skills applicable to analyzing diverse and complex business situations.
- Comprehension and evaluation of the economic, political, and societal effects of accounting techniques and authoritative pronouncements.
- Creation of an attitude conducive to lifelong learning.
- Continued development of listening, writing, and oral communication skills.

The accounting programs at WVU have separate accounting accreditation by the AACSB-The International Association for Management Education. WVU has the only separately accredited accounting programs in West Virginia. At the date of this printing, there are 76 universities in the nation that have achieved this status at both the undergraduate and graduate levels.

Requirements to Sit for CPA Examination

The specific requirements to sit for the CPA examination vary with each State Board of Accountancy. The requirements in all states are subject to change for each examination. Students should carefully review their undergraduate and MPA course work to ensure all CPA examination requirements will be met for their state. The web sites of the various Boards of Accountancy appear below.

February 2000 is the last application date for students to sit for the West Virginia CPA examination without meeting the 150-hour requirement of the WV Board of Accountancy. Students must have completed their bachelor's degree by the date of application.

For more information on specific requirements to become a CPA in various states, visit these web sites:

- www.state.wv.us/wvboa
West Virginia Board of Accountancy requirements to sit for examination and become a CPA in West Virginia.
- www.nasba.org
National Association of State Boards of Accountancy for addresses of all state Boards of Accountancy requirements to sit for examination and become a CPA by state.
- www.aicpa.org
Content specification of CPA examination and related information.

Financial Assistance

Financial Aid

WVU has a strong comprehensive financial aid program to help you finance your education. Although the cost to attend WVU is relatively low, more than half of our students qualify for financial aid awarded on the basis of need, merit, or a combination of the two. The free application for Federal Student Aid (FASA) must be filled out before March 1. Contact the Student Financial Aid Office at (304) 293-5242 for more information.

Part-time Employment

The Department of Accounting employs several full-time MPA students on an hourly basis as accounting course assistants. The Department also has an active program to assist students in obtaining part-time accounting positions within the university and with local businesses. If you are interested in part-time employment, please complete the enclosed Graduate Student Worker Form. As at most universities, tuition waivers and assistantships are not available at the master's degree level.

Program

The MPA program is a 30-hour program which can be completed in approximately 10 months of full-time study or 22 months half-time in Charleston and Morgantown. The program requires that the student have an undergraduate degree with a minimum of 24 hours in accounting. Work experience is not a requirement for admission. Students may enter the program on either a full-time or half-time basis. Fall is the preferred starting date. Careful selection of degree candidates limits the size of classes, leads to high quality efforts in the program, and permits frequent and direct contact between students and faculty. The full-time program consists of two 12-hour semesters and one 6-week summer term. The courses are taught on Monday through Thursday during the regular semester to encourage outside employment experience.

No thesis is required in the program, but communication skills are emphasized in all courses. Extensive use is made of microcomputers in accounting applications.

Admission to Program

Admission to the MPA program is determined by a committee of accounting faculty members. The committee acts upon individual applications within a short period of time after receipt of the completed application. Students currently in an undergraduate program should apply at the beginning of their final semester; admission is based upon grades earned during the first seven semesters of undergraduate study.

The admission committee seeks applicants who possess a 3.0 cumulative grade point average (calculated on all college courses completed or the last 60 hours); an accounting grade point average of 3.0 (calculated exclusive of principles, proctoring, internship, and independent study courses); and GMAT scores in the top 50 percent of each part of the exam. Candidates who meet most of the above requirements will still be considered.

The above requirements apply to both full and half-time student applicants. As an AACSB-accredited program in accounting, these requirements must also be met by non-degree students who desire to take any of the graduate courses required by the MPA program. Students are not permitted to take MPA courses under a trial or provisional admittance. The GPA and GMAT requirements must be met before enrolling in any MPA courses.

Students who possess appropriate GMAT scores and grade point averages but do not possess a bachelor's degree with a major in accounting (or equivalent) may apply for non-degree or provisional status while they are taking undergraduate prerequisite courses in accounting and business. The MPA degree is designed to follow an undergraduate degree in business. Students without a bachelor's degree with a major in accounting (or equivalent) may be required to take additional business and accounting courses.

Prerequisites

To assure that all students in the program have the same foundation in business, the following prerequisite courses, or their equivalent, must be completed before enrolling in M.P.A. graduate courses: principles of accounting (six hours), intermediate accounting (six hours), advanced accounting, cost accounting, income tax accounting, auditing, principles of economics (six hours), principles of marketing, principles of management, principles of finance, statistics, business law, and computer science. A student without the necessary prerequisite courses may be approved to enter the M.P.A. program as a provisional graduate student.

Master of Professional Accountancy

Courses will be offered in Morgantown in the College of Business and Economics Building and at the WVU Building in the Charleston Area Medical Center in Charleston. Classes begin August 25.

MPA Course Offerings 1998-99

<i>Fall</i>	<i>Hrs.</i>
*ACCT 330 <i>Financial Accounting Theory and Practice</i>	3
*ACCT 333 <i>Income Taxes and Business Decisions</i>	3
ACCT 349 <i>Oral/Written Skills for Professionals</i>	3
ACCT 491 <i>International Dimensions of Accounting</i>	3
	12
 <i>**Spring</i>	 <i>Hrs.</i>
ACCT 332 <i>Governmental and Nonprofit Accounting</i>	3
ACCT 335 <i>Computer Systems Auditing</i>	3
ACCT 338 <i>Controllorship</i>	3
ECON 391 <i>Economics for Decision-Makers</i>	3
	12
 <i>**Summer</i>	 <i>Hrs.</i>
ACCT 340 <i>Reporting Practices and Problems</i>	3
ACCT 345 <i>Auditing and Professional Accounting Standards</i>	3
	6
Total	30

Note: Students who have not completed Accounting Information Systems (Accounting 211, 3 hours) and Business Law and the CPA (Business Law 213, 3 hours) as part of their undergraduate program must also take these two courses in addition to the above 30 hours.

*Classes offered in Charleston and Morgantown on Monday and Wednesday. Accounting 330 meets from 2:30 to 3:45 p.m. and Accounting 333 meets from 4:00 to 5:15 p.m.

**Charleston spring and summer offerings will be determined later this year.

MPA Course Offerings 1999–2000

	Hours
ACCT 330 <i>Financial Accounting Theory and Practice</i>	3
ACCT 333 <i>Income Taxes and Business Decisions</i>	3
ACCT 391A <i>Accounting Information Systems Analysis</i>	3
ACCT 391B <i>Accounting and Information Technology</i>	3
ACCT 391C <i>Financial Reporting and Emerging Issues</i>	3
ACCT 391D <i>International Accounting and Business Practices</i>	3
ACCT 391E <i>Governmental and Nonprofit Accounting</i>	3
ACCT 391F <i>Information Technology Auditing</i>	3
ACCT 391G <i>Assurance Services and Standards</i>	3
ACCT 391H <i>Accounting and Business Consulting</i>	3
Total	30

Note: Students who have not completed Accounting Systems (Accounting 211, 3 hours) and Business Law and the CPA (Business Law 213, 3 hours) as part of their undergraduate program must also take these two courses in addition to the above 30 hours.

Academic Standards

The M.P.A. program requires that the student maintain a grade-point average of at least 3.0 on all work taken as a graduate student while enrolled in the College of Business and Economics, including prescribed work taken to remove undergraduate deficiencies. A student whose cumulative grade-point average falls below 2.75 will be placed on probation. If the average is not brought up to 2.75 by the end of the following semester, the student will be suspended from the program. A grade below C in more than one course taken while enrolled as a graduate student will result in suspension from the graduate program. Complete information about the M.P.A. program may be obtained by contacting the director of graduate programs.

Accounting (ACCT)

200. *Special Topics*. 1-4 HR. PR: ACCT 111 or consent. Special topics relevant to accounting. (Maximum of 9 semester hours in any or all courses numbered 200 offered by the College of Business and Economics may be applied toward bachelor's and master's degrees.)

210. *Advanced Accounting*. 3 HR. PR: ACCT 112. Accounting for business combinations, consolidations, foreign currency translation, governmental and not-for-profit entities, and equity method investment accounting.

211. *Accounting Systems*. 3 HR. PR: ACCT 110 and MANG 101. Analysis of data processing fundamentals and information systems analysis, design, and implementation, including necessary computer hardware and software components with particular reference to accounting information systems and the controls necessary therein.

213. *Income Tax Accounting*. 3 HR. PR: ACCT 111 or ACCT 116. Overview and survey of Federal income tax principles for individuals and simple corporations with emphasis on gross income, exemptions, and deductions, capital gains and losses, and tax credits.

214. *Income Tax Accounting*. 3 HR. PR: ACCT 213. The study of federal income tax treatment of partnerships, corporations and estates, and the treatment of those property transfers subject to the Federal Gift Tax, together with an introduction to tax research and tax procedure.

217. *Auditing Theory*. 3 HR. Coreq: ACCT 211. Auditing fundamentals, objectives, ethics, statistical sampling, standards and procedures. Emphasis on FASB and SAS disclosures.

330. *Financial Accounting Theory and Practice*. 3 HR. PR: ACCT 112. Comprehensive examination of financial accounting theory as established by the opinions, statements, and interpretation of professional organizations with special emphasis on their application and problem solving.

332. *Governmental and Nonprofit Accounting*. 3 HR. PR: ACCT 112. Fund accounting and control in governmental and nonprofit entities; identification and control of cost centers; cost analysis and cost finding, and planning and control of operations and resources.

333. *Income Taxes and Business Decisions*. 3 HR. PR: ACCT 213. Advanced federal income-tax problems with emphasis on tax planning for business decisions and tax research methodology.

335. *Computer Systems Auditing*. 2 HR. PR: ACCT 325. The analysis and design of control systems in a computerized accounting environment. Special emphasis on evaluating evidence to determine whether a computing system safeguards assets and maintains data integrity.

338. *Controllorship*. 3 HR. PR: Consent. Examination of the role of the controller in large entities in planning, measuring, evaluating, and controlling performance and in reporting to stockholders and governmental agencies.

340. *Reporting Practices and Problems*. 3 HR. PR: Consent. Evaluation of financial reporting practices and trends, including an examination of the reporting requirements of the SEC and other regulatory agencies. Practitioners will be used extensively for class discussion and presentations.

345. *Auditing and Professional Accounting Standards*. 3 HR. PR: ACCT 217. Professional objectives, principles, and standards of auditing; audit reports and related communications; and case studies of audit sampling, professional ethics, legal liability, and reporting.

349. *Seminar in Accounting*. 3 HR. PR: Consent.

391. *Advanced Topics*. 1-6 HR.

491. *Advanced Study*. 1-6 HR.

493. *Special Topics*. 1-6 HR.

495. *Independent Study*. 1-6 HR.

Business Administration

Paul J. Speaker, Director of Graduate Programs

333 Business and Economics Building

Degree Offered:

Master of Business Administration

The master of business administration program is accredited by the American Assembly of Collegiate Schools of Business (AACSB). It is offered as a full-time, day-class program in Morgantown and as a part-time program in Beckley, Bluefield, Charleston, Lewisburg, Morgantown, Parkersburg, Shepherdstown, and Wheeling. The standards of excellence that support accreditation by the AACSB are maintained at all instructional sites.

The M.B.A. degree program recognizes the need for a manager of the future to be able to anticipate and recognize change and then to manage resources advantageously in that environment. Thus, the curriculum emphasizes a general, broad-based approach to graduate education in management which provides the student with the qualitative and quantitative skills necessary for a manager to succeed in such an environment. The program develops a managerial perspective that is primarily line as opposed to staff oriented and is relevant to those in both private and public organizations.

Credit Hours

The plan of study requires a total of 48 semester hours of graduate credit. The program is designed for individuals with varying educational and professional backgrounds. No prior course work in business administration is required as a condition of admission to the program. No master's thesis is required for completion of the degree.

The full-time M.B.A. degree program is completed in 13 1/2 months of full-time study on the Morgantown campus. A full-time student can enter the program only on July 1 of each year and graduates in mid-August of the following year. Students may enter the part-time M.B.A. program in designated semesters. A minimum of two and a half years is required for the part-time student to complete the program.

Admission

Full-time To gain admission to the full-time M.B.A. program, an applicant must have a bachelor's degree from an accredited institution. The full-time M.B.A. program is designed for students with non-business undergraduate majors. Admissions decisions are based on an assessment of expected success in the program shown by the application materials and on space available. The admissions committee considers grade point average in all previous college-level work and also the grade point average in the last 60 hours of course work. The Graduate Management Admissions Test (GMAT) is required. Each applicant must submit a resume with the application. The admissions committee takes no action on an application for admission to the full-time program until the applicant submits a GMAT score.

Part-time To gain admission to the part-time M.B.A. program, an applicant must have a bachelor's degree in any discipline from an accredited institution. The Graduate Management Admissions Test (GMAT) is required. Each applicant must submit a resume showing prior work experience. Admissions decisions are based on assessments of expected success in the program as shown by the application materials and on space available. For applicants with less than five years of work experience, the GMAT and the undergraduate record provide the strongest indicators of success. For applicants with five or more years of experience, the admissions committee will place greater emphasis on the work history. For applicants with masters or doctoral degrees, the admissions committee may waive the GMAT requirement.

Transcripts and Deadlines

Applications for admission to the M.B.A. program and official transcripts of all prior academic work should be submitted to the WVU Office of Admissions and Records as early as possible. Applicants who have attended institutions other than WVU must request the registrar or records office of those institutions to forward a complete official transcript directly to the WVU Office of Admissions and Records. For the full-time program, the deadline for receipt of applications and transcripts in the College's Office of Graduate Programs is March 1. For the part-time program, the deadline is one month prior to the starting date requested. Admission to the program is competitive and subject to space being available.

Financial Aid

University scholarships are available on a competitive basis to minority students. Additional information and application forms can be obtained from the director of graduate programs.

M.B.A. Program

The M.B.A. degree program requires 48 hours of graduate credit, including the following courses:

- Accounting 311 *Financial Accounting for Decision Making*
- Accounting 321 *Managerial Control*
- Business Law 311 *Legal and Regulatory Environment*
- Economics 317 *Economic Decision Making*
- Economics 318 *Economic Policy*
- Economics 319 *Applied Business and Economics Statistics*

Finance 311 *Managerial Finance*
 Finance 321 *Corporate Financial Administration*
 Management 301 *Organizational Behavior and Ethics*
 Management 303 *Introduction to Management Science*
 Management 311 *Management Information Systems*
 Management 321 *Operations Management/Applied Quantitative Analysis*
 Management 325 *Seminar in Organizational Processes*
 Management 351 *Policy and Strategy*
 Marketing 311 *Marketing Management*
 Marketing 321 *Marketing Strategy*
 Seminar
 Seminar

Academic Standards

The M.B.A. requires that the candidate achieve a cumulative grade-point average of at least 3.0 on all work counting toward the graduate degree. A regular graduate student whose cumulative grade-point average falls below 2.75 will be placed on probation. If the average is not brought up to 2.75 by the end of the following semester, the student will be suspended from the program. A grade below C in more than one course taken while enrolled as a graduate student will result in suspension from the program. In addition, the student must maintain a 3.0 average in all work counting toward the graduate degree.

Part-time Program

Students in the part-time program are subject to the same requirements and restrictions as students enrolled in the full-time program. Classes in the part-time program are taught by graduate faculty members in the College. The M.B.A. part-time program is offered in its entirety in Beckley, Bluefield, Charleston, Lewisburg, Morgantown, Parkersburg, Shepherdstown, and Wheeling. Weekend classes normally meet on Friday evenings (7:00 to 10:00) and Saturdays (9:00 A.M. to 3:30 P.M.). A three semester-hour course normally meets for five weekends and a two semester-hour course for three weekends. Weekend classes may have examinations scheduled on weekday evenings. Weekday classes normally meet one or two evenings per week and on occasional Saturdays.

Accounting (ACCT)

200. *Special Topics*. 1-4 HR. PR: ACCT 111 or consent. Special topics relevant to accounting. (Maximum of 9 semester hours in any or all courses numbered 200 offered by the College of Business and Economics may be applied toward bachelor's and master's degrees.)

210. *Advanced Accounting*. 3 HR. PR: ACCT 112. Accounting for business combinations, consolidations, foreign currency translation, governmental and not-for-profit entities, and equity method investment accounting.

211. *Accounting Systems*. 3 HR. PR: ACCT 110 and MANG 101. Analysis of data processing fundamentals and information systems analysis, design, and implementation, including necessary computer hardware and software components with particular reference to accounting information systems and the controls necessary therein.

213. *Income Tax Accounting*. 3 HR. PR: ACCT 111 or ACCT 116. Overview and survey of Federal income tax principles for individuals and simple corporations with emphasis on gross income, exemptions, and deductions, capital gains and losses, and tax credits.

214. *Income Tax Accounting*. 3 HR. PR: ACCT 213. The study of federal income tax treatment of partnerships, corporations and estates, and the treatment of those property transfers subject to the Federal Gift Tax, together with an introduction to tax research and tax procedure.

217. *Auditing Theory*. 3 HR. Coreq: ACCT 211. Auditing fundamentals, objectives, ethics, statistical sampling, standards and procedures. Emphasis on FASB and SAS disclosures.

330. *Financial Accounting Theory and Practice*. 3 HR. PR: ACCT 112. Comprehensive examination of financial accounting theory as established by the opinions, statements and interpretation of professional organizations with special emphasis on their application and problem solving.

332. *Governmental and Nonprofit Accounting*. 3 HR. PR: ACCT 112. Fund accounting and control in governmental and nonprofit entities; identification and control of cost centers; cost analysis and cost finding, and planning and control of operations and resources.

333. *Income Taxes and Business Decisions*. 3 HR. PR: ACCT 213. Advanced federal income-tax problems with emphasis on tax planning for business decisions and tax research methodology.

335. *Computer Systems Auditing*. 2 HR. PR: ACCT 325. The analysis and design of control systems in a computerized accounting environment. Special emphasis on evaluating evidence to determine whether a computing system safeguards assets and maintains data integrity.

338. *Controllershship*. 3 HR. PR: Consent. Examination of the role of the controller in large entities in planning, measuring, evaluating, and controlling performance and in reporting to stockholders and governmental agencies.

340. *Reporting Practices and Problems*. 3 HR. PR: Consent. Evaluation of financial reporting practices and trends, including an examination of the reporting requirements of the SEC and other regulatory agencies. Practitioners will be used extensively for class discussion and presentations.

345. *Auditing and Professional Accounting Standards*. 3 HR. PR: ACCT 217. Professional objectives, principles, and standards of auditing; audit reports and related communications; and case studies of audit sampling, professional ethics, legal liability and reporting.

349. *Seminar in Accounting*. 3 HR. PR: Consent.

391. *Advanced Topics*. 1-6 HR.

491. *Advanced Study*. 1-6 HR.

493. *Special Topics*. 1-6 HR.

495. *Independent Study*. 1-6 HR.

Economics (ECON)

200. *Special Topics*. I, II, S. 1-4 HR. PR: ECON 54 and ECON 55. Special topics relevant to economics. (Maximum of nine semester hours in any or all courses numbered 200 offered by the College of Business and Economics may be applied toward the bachelor's and master's degrees.)

211. *Intermediate Micro Theory*. I, II. 3 HR. PR: ECON 54. Consumer choice and demand; price and output determination of the firm, and resource allocation, under different market structures; welfare economics, externalities, public goods, and market failure; general equilibrium; other topics.

212. *Intermediate Macro Theory*. I, II. 3 HR. PR: ECON 54 and ECON 55. Forces which determine the level of income, employment, output, the inflation rate, and the balance of trade. Particular attention to consumer behavior, investment determination, and government fiscal and monetary policy.

213. *Economic Development*. I or II. 3 HR. PR: ECON 54 and ECON 55. The problems, changes, and principal policy issues faced by non-industrialized countries.

216. *History of Economic Thought*. I or II. 3 HR. PR: ECON 54 and Econ 55. Economic ideas in perspective of historic development.

220. *Introduction to Mathematical Economics*. I or II. 3 HR. PR: ECON 54 and ECON 55 and (MATH 128 or MATH 15 or MATH 16.) Principal mathematical techniques including set operation, matrix algebra, differential and integral calculus employed in economic analysis. Particular attention given to static (or equilibrium) analysis, comparative-static analysis and optimization problems in economics.

225. *Applied Business and Economic Statistics*. I, II. 3 HR. PR: ECON 125 or STAT 101. Continuation of ECON 125. Principal statistical methods used in applied business and economic research including multiple regression, index numbers, time series analysis, forecasting models and methods, and sampling design.

226. *Introductory Econometrics*. I or II. 3 HR. PR: ECON 54, 55, (ECON 125 or STAT 101). Analysis of economic models using basic econometric methods. Specification, computation, and interpretation of linear regression.

241. *Public Economics*. I or II. 3 HR. PR: ECON 54 and ECON 55. Economic roles of the public sector. Particular attention to market failure, redistributing income, the financing of public sector activities, relationships between federal, state, and local governments, and public choice.
245. *Government and Business*. I or II. 3 HR. PR: ECON 54 and ECON 55. Examination of market structure, conduct, and performance. Analysis of market regulation including antitrust laws and regulation of monopolies.
246. *Transportation Economics*. 3 HR. PR: ECON 54 and ECON 55. Economic and institutional analysis of the domestic transportation system of the United States. Topics include role of transportation, carrier characteristics and services, transportation rates and costs, regulation of transportation.
250. *International Economics*. I or II. 3 HR. PR: ECON 54 and ECON 55. Development of trade among nations; theories of trade; policies, physical factors, trends, barriers to trade. Determination of exchange rates. Open economy macroeconomics.
255. *Regional Economics*. I. 3 HR. PR: ECON 54 and ECON 55. Analysis of the regional economy's spatial dimension, emphasizing interregional capital and labor mobility, the role of cities, objectives and issues of regional policy, lagging regions and Appalachia, growth poles, and regional growth and income distribution.
257. *Urban Economics*. I or II. 3 HR. PR: ECON 54 and ECON 55. Analyzes growth, decline, and socioeconomic problems of cities. Topics include the development of cities, urban spatial structure and land-use patterns, poverty and discrimination, housing, urban transportation and congestion, local government structure, and urban fiscal problems.
260. *Labor Economics*. I or II. 3 HR. PR: ECON 54 and ECON 55. Labor market analysis. Topics include wage and employment determination, human capital theory, discrimination, unemployment, migration, effects of unions and government regulation, and life-cycle patterns of work.
270. *American Economic History*. I or II. 3 HR. PR: ECON 54 and ECON 55. Central issues in the development of the American economy.
297. *Internship*. I, II, S. 1-12 HR. PR: ECON 54 and ECON 55 and departmental approval. Field experience in the analysis and solution of economic problems in the public and private sectors.
299. *Readings in Economics*. I, II, S. 1-6 HR. PR: ECON 54 and ECON 55 and departmental approval. Students will develop and carry out a program of specialized readings under the supervision of a cooperating instructor.
310. *Advanced Micro Theory 1*. 4 HR. PR: Department approval. Theory of production and allocation, utility theory, theory of the firm, pricing in perfect and imperfect markets, models of firm's operations.
311. *Advanced Micro Theory 2*. 4 HR. PR: ECON 310. General equilibrium analysis, distribution theory, welfare economics.
312. *Advanced Macro Theory 1*. 3 HR. PR: Department approval. Classical, Keynesian and modern macroeconomic theories.
313. *Advanced Macro Theory 2*. 3 HR. PR: ECON 312. Models of economic growth and fluctuations, and other advanced topics in macroeconomic theory.
316. *History of Economic Doctrines and Analysis*. 3 HR. PR: ECON 310 and graduate standing or consent. Writings of the major figures in the development of economic doctrines and analysis.
317. *Economic Decision Making*. 2 HR. PR: ECON 54 or consent. (Primarily for M.B.A. students.) Analysis of the firm as an optimizing unit operating in the market place. Examination of product demand, production and costs, pricing theory and practices, risk, and capital budgeting.
318. *Economic Policy*. 2 HR. PR: ECON 317 or consent. (Primarily for M.B.A. and M.P.A. students.) Microeconomic analysis of macroeconomic phenomena is considered with particular attention paid to the reaction by firms to price and interest rate effects of fiscal and monetary policy.
319. *Applied Business and Economics Statistics*. 3 HR. PR: Consent. Primary statistical methods used in business and economics research including hypothesis testing, estimation, linear regression, time series, and business forecasting. Statistical computer software is an integral part of the course.

320. *Mathematical Economics*. 3 HR. PR: Departmental approval. Mathematics used in economics.
325. *Econometrics 1*. 3 HR. PR: ECON 320. Mathematical statistics, including probability, mathematical expectation, distributions. Linear regression, ordinary least squares and simple extensions. Students will use a computer to analyze data.
326. *Econometrics 2*. 3 HR. PR: ECON 325. Econometric methods used by practicing economist. Includes simultaneous equations, asymptotic properties of estimators, and generalizations of and alternatives to least squares estimation. Also may include qualitative response, panel data, nonlinear, spatial, and time series models.
328. *Advanced Mathematical Economics*. 3 HR. PR: ECON 310 and ECON 320. Mathematical properties of microeconomic models of general equilibrium and welfare, existence, uniqueness, and stability of equilibrium. Applications of Hamiltonian and maximum principles to growth models and economic control problems. Investigation of separability theorems.
329. *Econometrics 3*. 3 HR. PR: ECON 326. Completes the graduate econometrics sequence. Topics may include computational methods and time series, spatial, nonlinear, qualitative response, and panel data models.
330. *Monetary Economics 1*. 3 HR. PR: ECON 312. Sources and determinants of supply of money; demand for money for transactions and speculative purposes; general equilibrium of money, interest, prices, and output; role of money in policy.
334. *Monetary Economics 2*. 3 HR. PR: ECON 330. Further topics in monetary economics.
340. *Public Economics 1*. 3 HR. PR: ECON 310. Economic role of government in a mixed economy with regard to topics such as resource allocation and distribution of income; social choice mechanisms; fiscal federalism; and revenue.
343. *Economic Analysis of Public Policies*. 3 HR. Application of economic analysis to questions of public policy. Consideration of problems of public goods and other market failures and usefulness of cost-benefit analysis to policy making. (Equivalent to POLS 331.)
344. *Public Economics 2*. 3 HR. PR: ECON 340. Continuation of public economics.
345. *Industrial Organization*. 3 HR. PR: ECON 310 and graduate standing or consent. Economic analysis of market structure, conduct, and performance; in-depth evaluation of markets and industries in the United States and the effect of government intervention on firm behavior.
349. *Public Regulation of Business*. I or II. 3 HR. Economic analysis of regulation of specific industries such as public utilities.
350. *International Trade*. 3 HR. PR: ECON 310. Contemporary theories of international trade; analysis of current problems in world trade.
354. *International Macroeconomics*. 3 HR. PR: ECON 312 Current theories and policies concerning balance of payments, international capital movements, and foreign exchange, and their relation to the macro economy.
355. *Advanced Regional Economics*. 3 HR. PR: ECON 310 and graduate standing or consent. Regional income and flow of funds estimation, regional cyclical behavior and multiplier analysis, industrial location and analysis, techniques of regional input-output measurement, impact of local government reorganization on regional public service and economic development.
357. *Advanced Urban Economics*. 3 HR. PR: ECON 310. Theory, policy, and empirical research regarding growth and decline of cities, urban spatial structure and land-use patterns, intra-metropolitan employment location, urban transportation, housing, housing market discrimination, local government structure, fiscal problems, and urban redevelopment.
358. *Spatial Economics*. 3 HR. PR: ECON 310 or consent. Spatial dimension incorporated into the study of economic activity; spatial competition, market area analysis, locational equilibrium analysis, general spatial equilibrium.
359. *Seminar in Regional Economics*. 3 HR.
360. *Advanced Labor Economics 1*. 3 HR. PR: ECON 310. Topics in advanced labor market analysis including structure of wages, investment in human capital, discrimination, effects of unions and government regulation and life-cycle issues.

364. *Advanced Labor Economics 2*. 3 HR. PR: ECON 360. Continuation of Advanced Human Resource Economics.

370. *Economic History*. 3 HR. Examination of the methods of research and issues in economic history of the United States.

374. *Seminar in Economic History*. 3 HR.

380. *Energy Economics*. 3 HR. PR: ECON 310. Welfare analysis of supply interruptions and the foreign dependence question. Study of various energy resources in reference to policy alternatives under variant growth conditions and input-output models. Examination of coal industry and coal externalities.

384. *Environmental Economics*. 3 HR. PR: ECON 380. Examination of the theoretical and empirical literature dealing with externalities (pollution), the relationships between pollution and social costs, the relationships between energy production and environmental quality, and the optimal strategies for pollution abatement.

390. *Independent Reading in Economics*. 3-6 HR. PR: Departmental approval. Supervised readings. For graduate students in special areas.

391. *Advanced Topics*. 1-6 HR.

397. *Research*. 1-15 HR.

409. *Research Design and Methodology*. I, II. 1-3 HR. PR: Departmental approval is required. Basic research approaches based on examples from the student's own work, papers presented at the departmental research seminar series, and economics literature in general.

490. *Teaching Practicum*. 1-3 HR.

491. *Advanced Study*. 3 HR. PR: ECON 310.

492. *Directed Study*. 1-6 HR.

493. *Special Topics*. 1-6 HR.

494. *Special Seminars*. 1-6 HR.

495. *Independent Study*. 1-6 HR.

496. *Graduate Seminar*. 1 HR.

497. *Research*. 1-15 HR.

498. *Thesis*. 2-4 HR.

499. *Graduate Colloquium*. 1-6 HR.

Finance (FIN)

200. *Special Topics*. 1-4 HR. Coreq: Fin 112 or 321. Special topics relevant to finance.

212. *Working Capital Management*. 3 HR. PR: FIN 112. Management of current assets and liabilities. Topics include the management of cash, marketable securities, accounts receivable, inventories, trade accounts payable, and short-term bank borrowings. Decision models are used extensively.

216. *Risk Management*. 3 HR. PR: FIN 115, Coreq: FIN 112. Transferable risks with which the entrepreneur must deal. Emphasis on the process by which decisions are made for handling these risks, including an examination of contributions and limitations of insurance system.

217. *Employee Benefit Plans*. 3 HR. PR: FIN 115. Use, design and regulation of group life insurance, health care and pensions, including their federal tax consequences. Study of the available contracts in each area and financing alternatives and practices.

218. *Life Insurance and Estate Planning*. 3 HR. PR: FIN 115. Principles of life and health insurance protection; application of life insurance to individual, family, business, and societal needs; study of trusts, wills and estates, integrating of income programming into estate management.

219. *Property and Liability Insurance*. 3 HR. PR: FIN 115. Study of the use and production of property and liability insurance, including evaluation of insurance contracts and current insurance practices; legal and regulatory environment affecting use and production of insurance.

220. *Social Insurance*. 3 HR. PR: FIN 115. Our social and political efforts to provide economic security for the general public. An examination of the parallel developments of private insurance.

250. *Security Analysis and Portfolio Management*. 3 HR. PR: FIN 150. The systematic selection, assessment, and ranking of corporate securities in a portfolio framework through a synthesis of fundamental analysis, technical analysis, and random walk.

251. *Bank Management*. 3 HR. Coreq: FIN 112. (May not be taken for both undergraduate and graduate credit.) Management of bank funds. Principles of organization lending and investment. Policy relationships to bank productivity, organization, and profitability; preparation of financial reports; management of a simulated bank in a changing environment.

252. *Advanced Bank Management*. 3 HR. PR: FIN 251. An Advanced course in commercial banking involving problems of management of the money position, loan and investment portfolio and capital adequacy. The student simulates actual bank operation, conducts case studies, and analyzes bank performance.

261. *Real Estate Appraising*. 3 HR. PR: FIN 161.

262. *Real Estate Finance*. 3 HR.

263. *Real Estate Investment and Land Development*. 3 HR.

290. *Advanced Finance*. 3 HR. PR: FIN 112, Conc: MANG 225. Integrative course in finance to be taken during the final semester before graduation.

297. *Internship in Finance*. I, II, S. 1-3 HR. PR: FIN 111 and department approval. Supervised practical experience in student's major field; identification, analysis, and evaluation of a specific project. (Student, under departmental supervision, arranges internship with sponsoring organization.)

299. *Independent Study*. 1-3 HR. PR: FIN 112 and department approval. Students will develop and complete a program of specialized studies under the supervision of a cooperating instructor.

311. *Managerial Finance*. 2 HR. PR: Consent. Analysis of the standard financial activities of the firm including: financial planning, structure of financing, and asset selection. Introduction to microcomputer problem solution.

321. *Corporate Financial Administration*. 3 HR. PR: FIN 111 or FIN 311, or consent. A study of theoretical concepts of corporate financial administration and the application of these concepts to real world case studies.

331. *Bank Management*. 3 HR. PR or Coreq.: FIN 311 or consent. (May not be taken for both undergraduate and graduate credit.) Management of bank funds. Principles of organization lending and investment. Policy relationships to bank productivity, organization, and profitability; preparation of financial reports; management of a simulated bank in a changing environment. (Same as FIN 251 with the addition of a research paper.)

335. *Money and Capital Markets*. 3 HR.

337. *Capital Budgeting*. 3 HR.

349. *Seminar in Finance*. 3 HR. PR: FIN 321.

391. *Advanced Topics*. 1-6 HR.

397. *Research*. 1-15 HR.

490. *Teaching Practicum*. 1-3 HR.

491. *Advanced Study*. 1-6 HR.

492. *Directed Study*. 1-6 HR.

493. *Special Topics*. 1-6 HR.

494. *Special Seminars*. 1-6 HR.

495. *Independent Study*. 1-6 HR.

496. *Graduate Seminar*. 1 HR.

497. *Research*. 1-15 HR.

498. *Thesis*. 2-4 HR.

499. *Graduate Colloquium*. 1-6 HR.

Industrial and Labor Relations (ILR)

260. *Survey of the Employment Relationship*. I. 3 HR. PR: 58 credits completed. Overview of employee and labor relations; management techniques, teams, labor-management relations, employment law, benefits, compensation, education and training programs, and current issues.

262. *Collective Bargaining and Labor Relations*. 3 HR. PR: ECON 260 or department approval. Examination of the theory and practice of collective bargaining. Topics include economic and historical environment, labor law, unionization, contract negotiation, patterns in contract content, conflict resolution, grievance handling, and an introduction to arbitration.

301. *Industrial Relations Analytical Techniques 1*. 3 HR. PR: Admission to the ILR graduate program and CS 5 or equivalent. Introduction to the software and hardware appropriate for use in human resource applications, emphasizing efficient and effective use of previously developed software. Introduction to quantitative analytical decision-making techniques.

302. *Industrial Relations Analytical Techniques 2*. 3 HR. PR: Admission to the ILR graduate program. Further development of the quantitative analytical techniques and of business information systems used in the human resources field. Emphasis on quantitative decision-making and information systems in an industrial relations setting.

303. *Critical Thinking and HR Research Methods*. I. 3 HR. Corequisite: ILR 262. Philosophy and methods of critical thinking and human resources research methods and practices.

304. *I. R. Theory and Strategy*. I. 3 HR. PR: Consent. Corequisite: ILR 262. Description and analysis of employee workplace governance systems in competitive and non-competitive markets. Search for rational employer-employee relationships in the US and internationally.

305. *Employment Law*. II. 3 HR. PR: Consent. Corequisite: ILR 262. Survey of the legal principles guiding the employer-employee relationship. Examines laws regulating hiring, job opportunity, discrimination, affirmative action, sexual harassment, wages, benefits, privacy right, health, safety, employment at will, layoffs, and termination.

306. *Performance Management and Training*. II. 3 HR. Corequisite: ILR 262. Development of individual employees in an organization; performance evaluation, discipline of problem employees, identifying training needs, and design and delivery of training programs.

307. *Conflict Management Processes*. S. I. 3 HR. Corequisite: ILR 262. PR: Consent. Sources of conflict in the workplace and processes utilized to deal with that conflict. Theories of conflict management, industry practices, and specific techniques for productive channeling of conflict. Significant experiential component.

308. *Organizational Change and Renewal*. S, II. 3 HR. Corequisite: ILR 262. Organizational evolution as a result of multiple change process, including employee involvement, empowerment, high performance organizations, process consulting, and goal setting. Emphasis on organizational and union relationships.

309. *Staffing and Selection*. II. 3 HR. Corequisite: ILR 262. Theoretical, practical, and legal issues involved in staffing and selection in organizations; human resource planning, recruiting, employment testing, statistical analysis, legal issues, and selection methods.

310. *Human Resources Economics*. 3 HR. PR: Admission to the ILR graduate program. Consideration of the conditions of employment and unemployment at both macro and micro levels under varying degrees of completion, including the process of labor force preparation, labor market data and policy.

320. *HR Information Systems*. II. 3 HR. Corequisite: ILR 262. Use of computers for human resource management; HRIS planning, development and implementation; evaluating existing software; development of a database unique to human resource management.

321. *Manage Culture Diverse Workfc.* I, S. 3 HR. Corequisite: ILR 262. Perceptions involving cultural diversity issues. Composition of the workforce and its impact on the corporate culture. Management theories, sociological paradigms and conflict resolution in addressing multi-cultural issues in the workplace.

322. *International Industrial Relations.* I. 3 HR. Corequisite: ILR 262. Analyzes the human resource and labor relations practices of firms and economies as they relate to the global market; basics of international business, legal/governmental environmental, labor movements, and industrial relations practices.

330. *Compensation Issues.* 3 HR. PR: Consent. Seminar in compensation designed to develop further understanding of compensation theory and practice. Topic areas will include labor supply, wage theory, legal constraints, motivation, equity theory, organizational development as well as compensation structure and administration.

332. *American Trade Unionism.* 3 HR. PR: ILR 262 or 316 or consent. Examines the rise of American unionism and traces historical factors shaping its philosophy. Topics include economic conditions and union history, comparisons of AFL and CIO structures and the AFL-CIO as a government.

333. *Seminar: Quality of Work Life.* 3 HR. PR: Consent. Analysis of current trends and approaches in "quality of work life improvement" with special attention to developments in participative management, job enrichment and gain sharing. Results of current research are featured.

334. *Work Group Dynamics and Leadership.* 3 HR. PR: Consent. Small group or individual research on topics related to leadership and group dynamics in the work environment including training and other human relations programs.

337. *Practicum in Industrial Interviewing.* 3 HR. PR: ILR 312 and consent. Experiential learning of industrial interviewing techniques covering legal and technical aspects of employment interviewing and other types of interviewing.

340. *Arbitration Theory and Practice.* 3 HR. PR: ILR 262 and consent. Study of the purpose of arbitration, trends, principles of contract construction, hearing procedure evidence, remedies, training and education of arbitrators, training of advocates, and decision writing. Students will arbitrate mock cases.

343. *Negotiation Strategy.* S, II. PR: Consent. Corequisite: ILR 262. Theory and practice of both principled negotiations and position bargaining; extensive role play and technique building exercises for individual and team negotiations; detailed preparation methods for all types of personal and professional negotiations.

344. *Benefits.* 3 HR. Considers employee benefits from the perspective of the industrial relations specialist who is responsible for articulating and administering a corporate program. Includes study of all benefits covered by major federal legislation.

345. *Equal Employment Opportunity Problems.* 3 HR. PR: Consent. A series of lectures by specialists in equal employment opportunity affairs. Lectures will include attorneys, directors of state and national EEO agencies, and representatives of business and industry and the labor movement.

391. *Advanced Topics.* 1-6 HR.

397. *Research.* 1-15 HR.

490. *Teaching Practicum.* 1-3 HR.

491. *Advanced Study.* 1-6 HR.

492. *Directed Study.* 1-6 HR.

493. *Special Topics.* 1-6 HR.

494. *Special Seminars.* 1-6 HR.

495. *Independent Study.* 1-6 HR.

496. *Graduate Seminar.* 1 HR.

497. *Research.* 1-15 HR.

498. *Thesis.* 2-4 HR.

499. *Graduate Colloquium*. 1-6 HR.

Management (MANG)

200. *Special Topics*. 1-4 HR. PR: MANG 105. Special topics relevant to management. (A maximum of nine semester hours in any special topics 200 course offered by the College of Business and Economics may be applied toward bachelor's and master's degrees.)

201. *Business Information Systems*. 3 HR. PR: MANG 101 and MANG 105. Use of EDP for decision making with emphasis on application in the functions of finance, marketing, personnel, accounting, and operations management.

205. *The Individual and the Organization*. 3 HR. PR: MANG 105. Examination of how the individual, the group, and the organization interact to influence the behavior of the business organization and that of its human resources.

206. *Organizational Theory and Analysis*. 3 HR. PR: MANG 105. Influences of structure on the behavior and dynamics of the business organization, including emphasis on becoming an effective manager.

211. *Advanced Production Management*. 3 HR. PR: MANG 111. Integration of quantitative techniques and their application to production problems. Utilizes cases and projects.

212. *Management Science*. I. 3 HR. PR: MANG 105. Study and application of quantitative methods to business problems in which deterministic conditions prevail.

216. *Personnel Management*. 3 HR. PR: MANG 105. Fundamental principles and practices related to the procurement, development, maintenance, and utilization of human resources. Focus on areas such as human resource planning, selection training, performance appraising, compensation, safety and health, and labor relations.

217. *Personnel and Compensation*. 3 HR. PR: MANG 216. Designing and implementing total compensation systems in both private and public sectors. The emerging elements of total compensation systems are included providing insights into problems and opportunities for personnel.

218. *Focal Points in Management*. 1-3 HR. PR: MANG 105. In-depth study of specialized management subjects, e.g., personnel interviewing, job descriptions, consulting, or organizational development. (Each subject is self-contained, spans one-third of a semester, and is valued at 1 credit hour.)

220. *Human Resource Management Research Methods*. II. 3 HR. PR: MANG 205. Research methods and measurement in human resource management; philosophy of science, ethics in research, research design, and analytical methods.

222. *Management Science*. II. 3 HR. PR: MANG 212. Study and application of quantitative methods to business problems in which probabilistic conditions prevail.

225. *Business Policy*. 3 HR. PR: 110 credit hours completed and MANG 101 and MANG 105 and MANG 111 and MKTG 111 and BLAW 111 and FIN 111. Integration of key components of the business curriculum. The case method is utilized to study a wide variety of policy issues including international and ethical concerns.

230. *Entrepreneurship*. 3 HR. PR: MANG 105. The role of the entrepreneur in business and society; includes an analysis of the individual entrepreneur, and investigates the nature and problems of establishing a new business enterprise.

260. *Practicum in Small Business*. 3 HR. PR: MANG 105. A practical training ground in the identification and solution of small business problems. Through interaction with the business community, students are exposed to the opportunities and difficulties of small business entrepreneurship.

297. *Internship in Management*. I, II, S. 1-3 HR. PR: Department approval. Supervised practical experience in student's major field; identification, analysis, and evaluation of a specific project. (Student, under departmental supervision, arranges internship with sponsoring organization.)

299. *Independent Study*. 1-3 HR. PR: Department approval. Student will develop and complete a program of specialized studies under the supervision of a cooperating instructor.

300. *Management Information Technology/Systems*. 3 HR.

301. *Organizational Behavior and Ethics*. 3 HR. PR: Consent. Interpersonal relationships through which administration becomes effective. Emphasis on human factors, but influences of economic and technological factors also are considered. Focus on ethics and importance of harmony between individual needs and organization goals.

303. *Introduction to Management Science*. 3 HR. PR: Consent. Study of management science models and techniques with applications in business decision-making problems. Coverage includes mathematical programming models, decision theory, simulation, network models, and other current management science topics.

304. *Quantitative Business Methods*. 3 HR.

311. *Management Information Systems*. 3 HR. PR: Consent. Examines computer technology, applications, information systems, and performance. Computer system planning, selection and implementation. Computer impact upon management, organization, and society from a managerial viewpoint.

321. *Operations Management/Applied Quantitative Analysis*. 3 HR. PR: Consent. Review of concepts, techniques and models encountered in manufacturing and service operations. Modeling approach and computer applications in operations management and management science are emphasized.

325. *Seminar in Organizational Processes*. 3 HR. PR: Consent. Examination of the dynamics of the successful organization. Emphasis on the organization as an institution and the role of the manager in the organization. Implications of international competition will be addressed.

330. *Organizational Development*. 3 HR.

335. *Human Resource Management*. 3 HR.

336. *Managerial Skills Seminar*. 3 HR.

340. *Methodology Management Science*. 3 HR.

349. *Seminar in Management*. 1-6 HR. PR: Consent. In-depth study of important management issues.

351. *Policy and Strategy*. 3 HR. PR: Consent. Capstone course. Integrates functional knowledge with strategy formulation and strategy implementation concepts. Cases of organizations varying in size, national affiliation, and profit orientation are analyzed with special emphasis on ethics and social responsibility.

391. *Advanced Topics*. 1-6 HR.

397. *Research*. 1-15 HR.

490. *Teaching Practicum*. 1-3 HR.

491. *Advanced Study*. 1-6 HR.

492. *Directed Study*. 1-6 HR.

493. *Special Topics*. 1-6 HR.

494. *Special Seminars*. 1-6 HR.

495. *Independent Study*. 1-6 HR.

496. *Graduate Seminar*. 1 HR.

497. *Research*. 1-15 HR.

498. *Thesis*. 2-4 HR.

499. *Graduate Colloquium*. 1-6 HR.

Marketing (MKTG)

200. *Special Topics*. 1-4 HR. PR: MKTG 111. Special topics relevant to marketing.

201. *Focal Points in Marketing*. 1-3 HR. PR: MKTG 111. In-depth study of specialized marketing subjects, e.g., franchising, tourism, packaging, or product development. (Each subject is self-contained, spans one-third of a semester, and is valued at 1 credit hour.)
203. *Sales Management*. 3 HR. PR: MKTG 111. Concentrates on the managerial responsibilities of sales managers for directing, motivating, and controlling a sales force plus the techniques of selling including objections and closing.
205. *Consumer Behavior*. 3 HR. PR: MKTG 113. The consumer decision process in a marketing framework. Emphasis on psychological and sociological concepts which influence the decision process.
207. *Business Logistics Management*. 3 HR. PR: MKTG 115. Examination of transportation, warehousing, materials handling, containerization, inventory control, purchasing, and warehouse location. Significant use made of problem solving with analytical tools.
208. *Global Marketing*. I. 3 HR. PR: MKTG 111. Evaluation and analysis of marketing strategies in a global environment; examination of the relationships between international buyer behavior and the elements of the marketing mix.
210. *Business to Business Marketing*. 3 HR. PR: MKTG 111. A study of marketing to three classes of customers; the commercial market, the institutional market, and government agencies.
211. *Marketing Management*. 3 HR. PR: MKTG 111, 12 hours of MKTG. Simulation, through live and written case study, should sharpen skills as the student makes analytical evaluations of marketing problems.
297. *Internship in Marketing*. I, II, S. 1-3 HR. PR: MKTG 111 and department approval. Supervised practical experience in student's major field; identification, analysis, and evaluation of a specific project. (Student under departmental supervision, arranges internship with sponsoring organization).
299. *Independent Study*. 1-3 HR. PR: MKTG 111 and department approval. Students will develop and complete a program of specialized studies under the supervision of a cooperating instructor.
311. *Marketing Management*. 2 HR. Introduction to marketing management with specific emphasis on consumer behavior and market segmentation, product planning, promotion, distribution, and pricing.
321. *Marketing Strategy*. 3 HR. Emphasis on formulating a marketing strategy and developing analytical and decision-making capabilities. Cases will be used to illustrate specific business situations.
330. *Management Product Development*. 3 HR.
335. *Management Distribution Systems*. 3 HR.
349. *Seminar in Marketing*. 3 HR.
391. *Advanced Topics*. 1-6 HR.
397. *Research*. 1-15 HR.
490. *Teaching Practicum*. 1-3 HR.
491. *Advanced Study*. 1-6 HR.
492. *Directed Study*. 1-6 HR.
493. *Special Topics*. 1-6 HR.
494. *Special Seminars*. 1-6 HR.
495. *Independent Study*. 1-6 HR.
496. *Graduate Seminar*. 1 HR.
497. *Research*. 1-15 HR.
498. *Thesis*. 2-4 HR.
499. *Graduate Colloquium*. 1-6 HR.

Economics

William Trumbull, Chairperson, Department of Economics

420 Business and Economics Building

Degrees Offered:

Master of Arts, Doctor of Philosophy

The master of arts and doctor of philosophy degrees in economics enable students to broaden and refine their knowledge of the concepts and methods of economic analysis. These programs are designed to prepare students for careers in business, government, and higher education. Student programs are planned with the assistance of a faculty advisor and approval of the Director of Graduate Programs. Additional information about the graduate programs in economics, and the regulations and requirements pertaining to them, may be obtained by securing a copy of *Graduate Programs in Economics* from the graduate director. Students are bound by these regulations and requirements, as well as those of the College of Business and Economics.

Prerequisites

To be admitted as a regular student, applicants must have a grade-point average of 3.0 or better for all undergraduate work completed and a minimum combined score of 1500 for the three parts of the general aptitude portion of the Graduate Record Examination. All students must submit their scores on the general aptitude portion of the Graduate Record Examination (GRE) and international students must also submit their scores on the TOEFL. In addition, it is required that all applicants will have completed at least one semester of each of the following courses: intermediate microeconomic theory, intermediate macroeconomic theory, calculus, and statistics. Applicants not meeting these entrance requirements may be admitted on a provisional and/or deficiency basis, subject to certain performance conditions during their first semester in residence.

Assistantships

A limited number of graduate assistantships and tuition scholarships are available on a competitive basis to full-time students. Major selection criteria include prior academic performance and GRE scores. Graduate assistants receive a cash stipend that is comparable in amount to that offered at other universities. Graduate assistants engage in research and/or teaching activities. The faculty of the Department of Economics also nominates outstanding applicants for University fellowships. Special scholarships are also available on a competitive basis to minority students. Further information and applications can be obtained from the Director of Graduate Programs.

Academic Standards

To qualify for a graduate degree in economics, students must earn a cumulative grade-point average (GPA) of 3.0 or better for all courses completed as a graduate student at WVU. A regular graduate student in economics whose cumulative GPA falls below 3.0 (B) upon completion of the first nine hours of graduate study is not in good standing and will be placed on probation. A student in the program whose cumulative GPA falls below 3.0 will be placed on probation as of the close of the semester in which the GPA fell below 3.0. Such a student, placed on probation, who fails to raise his/her cumulative GPA to 3.0 by the end of the semester succeeding that in which his/her GPA fell below 3.0 is subject to suspension from the program at the end of that probationary semester.

Other academic reasons for suspension from the program include failing grades on more than 50 percent of the course work taken in any semester, a third failure on either a microeconomic theory or macroeconomic theory comprehensive examination, a fourth failure on comprehensive field examinations, or failure to complete all degree requirements within the specified time limits.

Master of Arts Program

The master of arts program requires a total of 37 hours of graduate credit, including 22 hours of economics. At least 25 hours of course work completed must be at the 300 level. To qualify for the M.A. degree, graduate students in economics must earn a grade of B- or better in Economics 310 and 312, and a grade-point average of 3.0 in all courses attempted as a graduate student at WVU. The M.A. program has a thesis and a non-thesis option.

Specific course requirements include:

Economics 320 <i>Mathematical Economics</i>	3 HR.
Economics 310 <i>Advanced Microeconomic Theory 1</i>	4 HR.
Economics 312 <i>Advanced Macroeconomic Theory 1</i>	3 HR.

Statistics Requirement

Statistics 231 <i>Sampling Methods</i>	3 HR.
Economics 226 <i>Applied Econometrics</i>	3 HR.

or for students who consider going into the Ph.D. program, these two courses may be replaced by:

Economics 325 <i>Econometrics 1</i>	3 HR.
---	-------

The student must also select either thesis or non-thesis alternative:

- Thesis Alternative: An acceptable thesis for six hours is required and the student must pass a final oral examination.
- Nonthesis Alternative: In lieu of a thesis, the requirements for the M.A. are met by completion of two 300-level courses in one field of concentration in economics and submission of a research paper that gives evidence of substantial ability to conduct scholarly research.

Special M.A. Emphases

The M.A. program in economics includes optional special emphases administered by the College of Business and Economics jointly with other units on campus. These emphases are business analysis, mathematical economics, public policy, and statistics and economics. To earn the M.A. in economics with a special emphasis, students must complete the M.A. requirements (above) and fulfill other requirements pertaining to the particular emphasis. The emphases are best viewed as coherent sample programs developed in conjunction with other units and are designed to prepare students for employment in a particular area or specialty of economics.

Business Analysis Conducted in cooperation with other departments of the College of Business and Economics, the business analysis emphasis is designed to prepare students for employment in the business analysis area. As part of their M.A. program in economics, students complete 13 hours of business courses: *Financial Accounting, Managerial Finance, Corporate Financial Administration, Organizational Behavior and Ethics, and Marketing Management.*

Mathematical Economics The mathematical economics emphasis is conducted in cooperation with the Department of Mathematics. Students entering this emphasis must previously have taken 12 hours in mathematics, including a course in calculus equivalent to MATH 15. Additional requirements are *Advanced Micro Theory 2, Advanced Macro Theory 2, Econometrics, Mathematical Economics, Advanced Mathematical Economics, Applied Linear Algebra, and Introduction to Real Analysis.*

Public Policy The public policy emphasis is conducted in cooperation with the Department of Political Science and provides students with broad training in policy analysis skills and methods. Prior completion of at least six hours of political science course work is required. Additional requirements are *Introduction to Policy Research, Public Policy Analysis, and Economic Analysis of Public Policies.*

Statistics and Economics Conducted in cooperation with the Department of Statistics and Computer Science, the statistics and economics emphasis is designed to prepare students for employment in the public or private sector that demands the use of quantitative skills. Additional requirements are statistics, probability, applied regression analysis, and econometrics.

Doctor of Philosophy

At least four years of full-time graduate work beyond the baccalaureate degree are usually required to complete the doctorate. A minimum of two consecutive semesters in actual residence as a full-time graduate student is required. To qualify for the doctor of philosophy degree in economics, a student must earn a cumulative grade-point average of 3.0 in courses completed as a graduate student at WVU.

The Ph.D. degree is not awarded for the mere accumulation of course credits nor for the completion of the specified residence requirements. All students are required to complete the graduate core curriculum, prepare themselves in two fields of concentration, and pass at least two additional 300-level economics courses with grades of B or better. Each student must also submit an acceptable dissertation. A minimum of 45 hours of graduate work in economics at the 300 level is required for all candidates for the Ph.D. degree in economics.

Economics 310 <i>Advanced Microeconomic Theory 1</i>	4 HR.
Economics 311 <i>Advanced Microeconomic Theory 2</i>	4 HR.
Economics 312 <i>Advanced Macroeconomic Theory 1</i>	3 HR.
Economics 313 <i>Advanced Macroeconomic Theory 2</i>	3 HR.
Economics 320 <i>Mathematical Economics</i>	3 HR.
Economics 325 <i>Econometrics 1</i>	3 HR.
Economics 326 <i>Econometrics 2</i>	3 HR.
Economics 329 <i>Seminar in Econometrics</i>	3 HR.
Economics 409 <i>Research Design and Methodology</i>	1 HR.

Six semester hours (or the equivalent) must be taken in each of the student's two fields of concentration. Areas of concentration include monetary economics, public finance, regional and urban economics, labor economics, international economics, and resource economics. Other fields may also be approved. One of the fields of concentration may be in an outside area; selection must be approved by the graduate economics faculty.

Comprehensive Examinations Students must pass written comprehensive examinations in microeconomic theory, in macroeconomic theory, and in two fields. For detailed rules, see departmental *Graduate Programs in Economics* filed in the Office of Graduate Director.

Candidacy and Dissertation When an applicant has successfully completed all course work and passed the written comprehensive examinations, the applicant will be formally promoted to candidacy for the Ph.D. degree. The candidate must submit a dissertation pursued under the supervision of a member of the graduate faculty in economics on some problem in the area of the candidate's major interest. The dissertation must present the results of the candidate's individual investigation and must embody a definite contribution to knowledge. It must be approved by a committee of the graduate faculty in economics. After approval of the candidate's dissertation and satisfactory completion of other graduate requirements, a final oral examination on the dissertation is required.

Each Ph.D. candidate is required to present a dissertation proposal to the graduate director after approval by at least three members of his or her dissertation committee including the chairperson. This proposal will include a statement of the problem (topic summary), a preliminary survey of the literature, a description of the research methodology, and other pertinent material. With the approval of the graduate director, the student is then required to present the proposal in a faculty-student seminar. Credit for dissertation research and writing is available under Economics 497, but only if the student has a dissertation chairperson and an approved topic.

Ph.D. Emphases

The Ph.D. program includes optional special emphases conducted in cooperation with other units on campus. These are industrial relations and mathematical economics. The emphases specify certain concentrations of course work and comprehensive examinations. Acceptable dissertations are required of all students.

Industrial Relations Graduate work in industrial relations typically is interdisciplinary in nature. The Ph.D. emphasis retains the interdisciplinary orientation while providing students with a Ph.D.-level of understanding of economic theory and economic analysis. Students in the industrial relations emphasis take the core courses in the Ph.D. program and take comprehensive examinations in microeconomic and macroeconomic theory.

Students are required to complete two fields of concentration. One field must be industrial relations, which consists of the following courses:

Industrial and Labor Relations 334 *Leadership & Work Group Dynamics*

Industrial and Labor Relations 342 *Advanced Collective Bargaining*

Industrial and Labor Relations 491A *Practicum in Research Methods*

Industrial and Labor Relations 491B *Research Theory*

The remaining field must be from within the Department of Economics. Most commonly, this field is labor economics. Students must pass written comprehensive examinations in their two fields of concentration.

Mathematical Economics The mathematical economics emphasis is conducted in cooperation with the Department of Mathematics. To be admitted into this emphasis, students must have completed a minimum of 12 hours in mathematics, including a course in calculus equivalent to Mathematics 15. In addition to the Economics Ph.D. core, students are required to take the following courses:

Economics 328 *Advanced Mathematical Economics*

Mathematics 241 *Applied Linear Algebra*

Mathematics 251, 252 *Introduction to Real Analysis*

(MATH 251 and 252 may be replaced by MATH 317, 318.)

Mathematics 357 *Calculus of Variations*

Mathematics Elective—3 HR.

Students are required to successfully complete comprehensive examinations in microeconomic and macroeconomic theory, mathematical economics/econometrics, and one other field in economics.

Economics (ECON)

Specialized Courses

200. *Special Topics*. I, II, S. 1-4 HR. PR: ECON 54 and ECON 55. Special topics relevant to economics. (Maximum of nine semester hours in any or all courses numbered 200 offered by the College of Business and Economics may be applied toward the bachelor's and master's degrees.)

297. *Internship*. I, II, S. 1-12 HR. PR: ECON 54 and ECON 55 and departmental approval. Field experience in the analysis and solution of economic problems in the public and private sectors.

317. *Economic Decision Making*. 2 HR. PR: ECON 54 or consent. (Primarily for M.B.A. students.) Analysis of the firm as an optimizing unit operating in the market place. Examination of product demand, production and costs, pricing theory and practices, risk, and capital budgeting.

318. *Economic Policy*. 2 HR. PR: ECON 317 or consent. (Primarily for M.B.A. and M.P.A. students.) Microeconomic analysis of macroeconomic phenomena is considered with particular attention paid to the reaction by firms to price and interest rate effects of fiscal and monetary policy.

319. *Applied Business and Economics Statistics*. 3 HR. PR: Consent. Primary statistical methods used in business and economics research including hypothesis testing, estimation, linear regression, time series, and business forecasting. Statistical computer software is an integral part of the course.

343. *Economic Analysis of Public Policies*. 3 HR. Application of economic analysis to questions of public policy. Consideration of problems of public goods and other market failures and usefulness of cost-benefit analysis to policymaking. (Equivalent to POLS 331.)

Economic Theory

211. *Intermediate Micro Theory*. I, II. 3 HR. PR: ECON 54. Consumer choice and demand; price and output determination of the firm, and resource allocation, under different market structures; welfare economics, externalities, public goods, and market failure; general equilibrium; other topics.

212. *Intermediate Macro Theory*. I, II. 3 HR. PR: ECON 54 and ECON 55. Forces which determine the level of income, employment, output, the inflation rate, and the balance of trade. Particular attention to consumer behavior, investment determination, and government fiscal and monetary policy.

216. *History of Economic Thought*. I or II. 3 HR. PR: ECON 54 and Econ 55. Economic ideas in perspective of historic development.

310. *Advanced Micro Theory 1*. 4 HR. PR: Department approval. Theory of production and allocation, utility theory, theory of the firm, pricing in perfect and imperfect markets, models of firm's operations.

311. *Advanced Micro Theory 2*. 4 HR. PR: ECON 310. General equilibrium analysis, distribution theory, welfare economics.

312. *Advanced Macro Theory 1*. 3 HR. PR: Department approval. Classical, Keynesian and modern macroeconomic theories.

313. *Advanced Macro Theory 2*. 3 HR. PR: ECON 312. Models of economic growth and fluctuations, and other advanced topics in macroeconomic theory.

316. *History of Economic Doctrines and Analysis*. 3 HR. PR: ECON 310 and graduate standing or consent. Writings of the major figures in the development of economic doctrines and analysis.

384. *Environmental Economics*. 3 HR. PR: ECON 380. Examination of the theoretical and empirical literature dealing with externalities (pollution), the relationships between pollution and social costs, the relationships between energy production and environmental quality, and the optimal strategies for pollution abatement.

390. *Independent Reading in Economics*. 3-6 HR. PR: Departmental approval. Supervised readings. For graduate students in special areas.

Quantitative Economics

220. *Introduction to Mathematical Economics*. 3 HR. PR: MATH 15 or 128, and ECON 54 and 55; or consent. Principal mathematical techniques including set operation, matrix algebra, differential and integral calculus employed in economic analysis. Particular attention given to static (or equilibrium) analysis, comparative-static analysis, and optimization problems in economics.

225. *Applied Business and Economic Statistics*. 3 HR. PR: ECON 125 or STAT 101 or consent. Continuation of ECON 125. Principal statistical methods used in applied business and economic research including multiple regression, index numbers, time series analysis, forecasting models and methods, and sampling design.

226. *Introductory Econometrics*. I or II. 3 HR. PR: ECON 54, 55 (ECON 125 or STAT 101). Analysis of economic models using basic econometric methods. Specification, computation, and interpretation of linear regression.

320. *Mathematical Economics*. 3 HR. PR: Departmental approval. Mathematics used in economics.

325. *Econometrics 1*. 3 HR. PR: ECON 320. Mathematical statistics, including probability, mathematical expectation, distributions. Linear regression, ordinary least squares and simple extensions. Students will use a computer to analyze data.

326. *Econometrics 2*. 3 HR. PR: ECON 325. Econometric methods used by practicing economist. Includes simultaneous equations, asymptotic properties of estimators, and generalizations of and alternatives to least squares estimation. Also may include qualitative response, panel data, nonlinear, spatial, and time series models.

328. *Advanced Mathematical Economics*. 3 HR. PR: Consent. Mathematical properties of microeconomic models of general equilibrium and welfare, existence, uniqueness, and stability of equilibrium. Applications of Hamiltonian and maximum principles to growth models and economic control problems. Investigation of separability theorems.

329. *Econometrics 3*. 3 HR. PR: ECON 326. Completes the graduate econometrics sequence. Topics may include computational methods and time series, spatial, nonlinear, qualitative response, and panel data models.

Monetary Economics

330. *Monetary Economics*. 3 HR. PR: ECON 312 or consent. Sources and determinants of supply of money; demand for money for transactions and speculative purposes; general equilibrium theory of money, interest, prices, and output; role of money in policy.

334. *Monetary Economics 2*. 3 HR. PR: ECON 330. Further topics in monetary economics.

Public Economics

241. *Public Economics*. I or II. 3 HR. PR: ECON 54 and ECON 55. Economic roles of the public sector. Particular attention to market failure, redistributing income, the financing of public sector activities, relationships between federal, state, and local governments, and public choice.

340. *Public Economics 1*. 3 HR. PR: ECON 310. Economic role of government in a mixed economy with regard to topics such as resource allocation and distribution of income; social choice mechanisms; fiscal federalism; and revenue.

344. *Public Economics 2*. 3 HR. PR: ECON 340. Continuation of public economics.

Public Regulation and Control

241. *Public Economics*. I or II. 3 HR. PR: ECON 54 and ECON 55. Economic roles of the public sector. Particular attention to market failure, redistributing income, the financing of public sector activities, relationships between federal, state, and local governments, and public choice.

245. *Government and Business*. I or II. 3 HR. PR: ECON 54 and ECON 55. Examination of market structure, conduct, and performance. Analysis of market regulation including antitrust laws and regulation of monopolies.

246. *Transportation Economics*. 3 HR. PR: ECON 51 or 55. Economic and institutional analysis of the domestic transportation system of the United States. Topics include role of transportation, carrier characteristics and services, transportation rates and costs, regulation of transportation.

345. *Industrial Organization*. 3 HR. PR: ECON 310 and graduate standing or consent. Economic analysis of market structure, conduct, and performance; in-depth evaluation of markets and industries in the United States and the effect of government intervention on firm behavior.

349. *Public Regulation of Business*. I or II. 3 HR. Economic analysis of regulation of specific industries such as public utilities.

International Economics

250. *International Economics*. I or II. 3 HR. PR: ECON 54 and ECON 55. Development of trade among nations; theories of trade; policies, physical factors, trends, barriers to trade. Determination of exchange rates. Open economy macroeconomics.

350. *International Trade*. 3 HR. PR: ECON 310. Contemporary theories of international trade; analysis of current problems in world trade.

354. *International Macroeconomics*. 3 HR. PR: ECON 312 Current theories and policies concerning balance of payments, international capital movements, and foreign exchange, and their relation to the macro economy.

Regional Economics

255. *Regional Economics*. 3 HR. PR: ECON 51 or 55. Analysis of the regional economy's spatial dimension, emphasizing interregional capital and labor mobility, the role of cities, objectives and issues of regional policy, lagging regions and Appalachia, growth poles, and regional growth and income distribution.

257. *Urban Economics*. I or II. 3 HR. PR: ECON 54 and ECON 55. Analyzes growth, decline, and socioeconomic problems of cities. Topics include the development of cities, urban spatial structure and land-use patterns, poverty and discrimination, housing, urban transportation and congestion, local government structure, and urban fiscal problems.

355. *Advanced Regional Economics*. 3 HR. PR: ECON 310 and graduate standing or consent. Regional income and flow of funds estimation, regional cyclical behavior and multiplier analysis, industrial location and analysis, techniques of regional input-output measurement, impact of local government reorganization on regional public service and economic development.

357. *Advanced Urban Economics*. 3 HR. PR: ECON 310. Theory, policy, and empirical research regarding growth and decline of cities, urban spatial structure and land-use patterns, intra-metropolitan employment location, urban transportation, housing, housing market discrimination, local government structure, fiscal problems, and urban redevelopment.

358. *Spatial Economics*. 3 HR. PR: ECON 310 or consent. Spatial dimension incorporated into the study of economic activity; spatial competition, market area analysis, locational equilibrium analysis, general spatial equilibrium.

359. *Seminar in Regional Economics*. 3 HR.

Labor Economics

260. *Labor Economics*. I or II. 3 HR. PR: ECON 54 and ECON 55. Labor market analysis. Topics include wage and employment determination, human capital theory, discrimination, unemployment, migration, effects of unions and government regulation, and life-cycle patterns of work.

360. *Advanced Labor Economics 1*. 3 HR. PR: ECON 310. Topics in advanced labor market analysis including structure of wages, investment in human capital, discrimination, effects of unions and government regulation and life-cycle issues.

364. *Advanced Labor Economics 2*. 3 HR. PR: ECON 360. Continuation of Advanced Human Resource Economics.

Economic History

270. *American Economic History*. I or II. 3 HR. PR: ECON 54 and ECON 55. Central issues in the development of the American economy.

370. *Economic History*. 3 HR. Examination of the methods of research and issues in economic history of the United States.

374. *Seminar in Economic History*. 3 HR.

Economic Development

213. *Economic Development*. 3 HR. PR: ECON 54 and 55. The problems, changes, and principal policy issues faced by nonindustrialized countries.

Energy and Environmental Economics

380. *Energy Economics*. 3 HR. PR: Graduate standing and consent. Welfare analysis of supply interruptions and the foreign dependence question. Study of various energy resources in reference to policy alternatives under variant growth conditions and input-output models. Examination of coal industry and coal externalities.

384. *Environmental Economics*. 3 HR. PR: ECON 310 and ECON 380 or MER 345 and graduate standing or consent. Examination of the theoretical and empirical literature dealing with externalities (pollution), the relationships between pollution and social costs, the relationships between energy production and environmental quality, and the optimal strategies for pollution abatement.

Other Economics Courses

299. *Readings in Economics*. I, II, S. 1-6 HR. PR: ECON 54 and ECON 55 and departmental approval. Students will develop and carry out a program of specialized readings under the supervision of a cooperating instructor.

390. *Independent Reading in Economics*. 3-6 HR. Supervised readings. For graduate students in special areas.

409. *Research Design and Methodology*. I, II. 1-3 HR. PR: Completion of the comprehensive theory exams or consent. Basic research approaches based on examples from the student's own work, papers presented at the departmental research seminar series, and economics literature in general.

491. *Seminar in Applied Economic Analysis*. 3 HR. PR: 12 HR. of graduate-level economics.

497. *Research*. 1-15 HR.

Industrial Relations

Dietrich Schaupp, Coordinator, Industrial Relations

116 Business and Economics Building

Degrees Offered:

Master of Science

Industrial Relations Area of Emphasis available for

Doctor of Philosophy

The Department of Management and Industrial Relations offers a master of science in industrial relations. The AACSB accredited program of study prepares students for professional positions in human resources (employee relations) and labor relations. Course

work can be structured to prepare students for doctoral studies in industrial relations, economics, management, or law.

Doctor of Philosophy Studies

The department operates, in conjunction with the Department of Economics, an industrial relations Doctor of Philosophy option. Master's students who plan to pursue the industrial relations option in the Ph.D. program in economics should align their master's work with the degree requirements.

Entry-level professional opportunities for IR graduates include such positions as employee relations associate, assistant personnel manager, human resources administrator, labor relations representative, professional research analyst, compensation analyst and benefits administrator. Other positions include staff representative with organized labor, apprentice arbitrator, labor-management consultant, National Labor Relations Board field examiner, government employee relations representative, and employment analyst. Many graduates are employed by Fortune 500 companies. Some find positions with organized labor, all levels of government, and advocacy organizations. The department, in conjunction with the WVU Career Services Center, makes a concerted effort to place graduates in positions that fulfill student job objectives.

Curriculum

The curriculum is a blend of theory, analysis, and pragmatism. Core course work serves two purposes: to provide in-depth knowledge and skills pertaining to the human resource and labor relations functions of organizations, and to acquaint students with the operation of the other organizational business functions.

IRSA

Students are encouraged to participate in academic-related extracurricular activities. Many are cosponsored by the Industrial Relations Student Association: the *ILR Newsletter*, resume mailings, social events, and honors banquets. Outstanding academic achievement is recognized by membership in the Industrial Relations Honor Society. The faculty makes Outstanding IR Student awards yearly to persons selected on the basis of scholarship, informal leadership and extracurricular activities.

Financial Aid

Scholarships are available on a competitive basis to minority students. Additional information and application forms can be obtained from the Director of Graduate Programs.

GOALS

Graduate Opportunities for Advanced Level Study (GOALS) is the minority recruiting program of a national consortium of IR schools. Minority students admitted to WVU's IR program are eligible to compete for full fellowships offered by GOALS.

Academic Common Market

The master of science program in industrial relations is an Academic Common Market program. Residents of Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, South Carolina, Tennessee, Texas, or Virginia who are admitted to the M.S. IR program can pay tuition at West Virginia University's in-state (resident) rates.

Admission

The master of science in industrial relations is interdisciplinary in nature and no specific undergraduate major is required. Course work in computer science, labor economics, statistics, and business disciplines is helpful. To gain admission into the master of science in industrial relations program, an applicant must have a bachelor's degree from an accredited institution. Overall grade point average is considered with additional attention given to the grade point average achieved in the last sixty hours of course work.

Either the Graduate Management Admissions Test (GMAT) or the Graduate Record Examination (GRE) is required. A resume is a requirement of the application process. No action is taken on an application for admission until a GMAT or GRE score is submitted. International students must also submit a satisfactory TOEFL score.

Although not required, applicants may wish to send additional supportive material, including letters in support of their application, reference letters, a resume of work experience, and an example of written work.

Application Deadlines

Students may enter the graduate program in summer or fall sessions. Application deadlines are two months before the start of classes in the term for which admission is sought. Later applications, while acceptable, may diminish the chances for admission due to the graduate class being filled. Since no admission decision can be made without the applicant's GMAT/GRE score being submitted, applicants should keep in mind the GMAT/GRE test schedule.

Institute of Industrial and Labor Relations

The mission of the Institute of Industrial and Labor Relations (ILR) is to coordinate instruction, research, and public service activities, which embrace a study of the elements of human resources development uniquely identified with the economy of West Virginia. Membership is open to faculty who have an interest in the mission of the ILR. The ILR serves as a means of rational response to economic trends based on an amalgamation of the three University functions: faculty/student research on a continuing basis in search of human resource development possibilities; use of research results in credit instruction to produce a growing cadre of graduates aware of and trained to be able to contribute to the state's economic goals; and, using both of the former, extension and public service efforts designed to place the state's human resource development and use activities on their most economically rational courses.

IR Degree Program

ILR 260 <i>Survey of the Employment Relations</i>	3 HR.
ILR 262 <i>Collective Bargaining and Labor Relations</i>	3 HR.
PR: <i>Econ 160 or Consent</i>	
ILR 303 <i>Critical Thinking and HR Research Methods</i>	3 HR.
ILR 304 <i>Industrial Relations Theory and Strategy</i>	3 HR.
IRL 305 <i>Employment Law</i>	3 HR.
ILR 306 <i>Performance Management and Training</i>	3 HR.
ILR 307 <i>Conflict Management Processes</i>	3 HR.
ILR 308 <i>Organizational Change and Renewal</i>	3 HR.
ILR 309 <i>Staffing and Selection</i>	3 HR.
ILR 320 <i>Human Resource Information Systems</i>	3 HR.
ILR 321 <i>Managing the Culturally Diverse Workforce</i>	3 HR.
ILR 322 <i>International Industrial Relations</i>	3 HR.
ILR 330 <i>Compensation Issues</i>	3 HR.
ILR 334 <i>Work Group Dynamics and Leadership</i>	3 HR.
ILR 337 <i>Practicum in Industrial Interviewing</i>	3 HR.
ILR 340 <i>Arbitration Theory and Practice</i>	3 HR.
ILR 343 <i>Negotiation Strategy</i>	3 HR.
ILR 344 <i>Benefits</i>	3 HR.
ILR 345 <i>Equal Employment Opportunity Problems</i>	3 HR.

Tentative Recommended Course Scheduling

Select one elective each semester or term

Summer I

307 *Conflict Management
Renewal*

Accounting/Finance/CBK*

Management/Marketing/CBK*

337* *Interviewing***

Summer II

308^B *Organizational Change and*

343* *Negotiation*

321* *Managing Cultural Diversity***

Fall Spring

303 *Critical Thinking & Research
Methods*

344 *Benefits*

330 *Compensation Issues*

262/362^A *Collective Bargaining*

322* *International Industrial Relations*

345* *Equal Employment Opportunity
Problems*

334^B *Group Dynamics and Leadership*

304 *Industrial Relations Theory and
Strategy*

305 *Employment Law*

306 *Performance Management and
Training*

309 *Staffing and Selection*

340* *Arbitration*

320* *Human Resource Information
Systems*

*Courses designed for entering students that do not have undergraduate background in business and economics. Total program credit requirements for nonbusiness related undergraduates majors are 48 credit hours; for business-related undergraduates the required credit hours are 42.

**Tentative

*Elective - Choose one.

^A- For internship scheduling purposes only, ILR 362 may be substituted for ILR 307.

^B- For internship scheduling purposes only, ILR 334 may be substituted for ILR 308.

GPA

The industrial relations program requires that the student maintain a grade-point average of at least 3.0 on all work taken as a graduate student while enrolled in the College of Business and Economics. In addition, the student must maintain a 3.0 average in all work counting toward the graduate degree. A student whose cumulative grade-point average falls below 2.75 will be placed on probation. If the student's average is not brought up to 2.75 by the end of the following semester, the student will be suspended from the program. A grade below C in more than one course taken while enrolled as a graduate student will result in suspension from the program.

Industrial Relations Emphasis in the Economics Ph.D. Program

Graduate work in industrial relations typically is interdisciplinary in nature. The Ph.D. emphasis retains this orientation while providing students with a Ph.D. level of understanding of economic theory and economic analysis. Students in the industrial relations option take the nine core courses in the Ph.D. in economics program, take comprehensive examinations in microeconomic theory and macroeconomic theory, and follow the rules and requirements for obtaining the economics Ph.D.

Industrial and Labor Relations (ILR)

260. *Survey of the Employment Relationship*. I. 3 HR. PR: 58 credits completed. Overview of employee and labor relations; management techniques, teams, labor-management relations, employment law, benefits, compensation, education and training programs, and current issues.

262. *Collective Bargaining and Labor Relations*. 3 HR. PR: ECON 260 or department approval. Examination of the theory and practice of collective bargaining. Topics include economic and historical environment, labor law, unionization, contract negotiation, patterns in contract content, conflict resolution, grievance handling, and an introduction to arbitration.

301. *Industrial Relations Analytical Techniques 1*. 3 HR. PR: Admission to the ILR graduate program and CS 5 or equivalent. Introduction to the software and hardware appropriate for use in human resource applications, emphasizing efficient and effective use of previously developed software. Introduction to quantitative analytical decision-making techniques.

302. *Industrial Relations Analytical Techniques 2*. 3 HR. PR: Admission to the ILR graduate program. Further development of the quantitative analytical techniques and of business information systems used in the human resources field. Emphasis on quantitative decision-making and information systems in an industrial relations setting.

303. *Critical Thinking and HR Research Methods*. I. 3 HR. Corequisite: ILR 262. Philosophy and methods of critical thinking and human resources research methods and practices.

304. *I. R. Theory and Strategy*. I. 3 HR. PR: Consent. Corequisite: ILR 262. Description and analysis of employee workplace governance systems in competitive and non-competitive markets. Search for rational employer-employee relationships in the US and internationally.

305. *Employment Law*. II. 3 HR. PR: Consent. Corequisite: ILR 262. Survey of the legal principles guiding the employer-employee relationship. Examines laws regulating hiring, job opportunity, discrimination, affirmative action, sexual harassment, wages, benefits, privacy right, health, safety, employment at will, layoffs, and termination.

306. *Performance Management and Training*. II. 3 HR. Corequisite: ILR 262. Development of individual employees in an organization; performance evaluation, discipline of problem employees, identifying training needs, and design and delivery of training programs.

307. *Conflict Management Processes*. S. I. 3 HR. Corequisite: ILR 262. PR: Consent. Sources of conflict in the workplace and processes utilized to deal with that conflict. Theories of conflict management, industry practices, and specific techniques for productive channeling of conflict. Significant experiential component.

308. *Organizational Change and Renewal*. S, II. 3 HR. Corequisite: ILR 262. Organizational evolution as a result of multiple change process, including employee involvement, empowerment, high performance organizations, process consulting, and goal setting. Emphasis on organizational and union relationships.

309. *Staffing and Selection*. II. 3 HR. Corequisite: ILR 262. Theoretical, practical, and legal issues involved in staffing and selection in organizations; human resource planning, recruiting, employment testing, statistical analysis, legal issues, and selection methods.

310. *Human Resources Economics*. 3 HR. PR: Admission to the ILR graduate program. Consideration of the conditions of employment and unemployment at both macro and micro levels under varying degrees of completion, including the process of labor force preparation, labor market data and policy.

320. *HR Information Systems*. II. 3 HR. Corequisite: ILR 262. Use of computers for human resource management; HRIS planning, development and implementation; evaluating existing software; development of a database unique to human resource management.

321. *Manage Culture Diverse Workfc*. I, S. 3 HR. Corequisite: ILR 262. Perceptions involving cultural diversity issues. Composition of the workforce and its impact on the corporate culture. Management theories, sociological paradigms and conflict resolution in addressing multi-cultural issues in the workplace.

322. *International Industrial Relations*. I. 3 HR. Corequisite: ILR 262. Analyzes the human resource and labor relations practices of firms and economies as they relate to the global market; basics of international business, legal/governmental environmental, labor movements, and industrial relations practices.

330. *Compensation Issues*. 3 HR. PR: Consent. Seminar in compensation designed to develop further understanding of compensation theory and practice. Topic areas will include labor supply, wage theory, legal constraints, motivation, equity theory, organizational development as well as compensation structure and administration.

332. *American Trade Unionism*. 3 HR. PR: ILR 262 or 316 or consent. Examines the rise of American unionism and traces historical factors shaping its philosophy. Topics include economic conditions and union history, comparisons of AFL and CIO structures and the AFL-CIO as a government.

333. *Seminar: Quality of Work Life*. 3 HR. PR: Consent. Analysis of current trends and approaches in "quality of work life improvement" with special attention to developments in participative management, job enrichment and gain sharing. Results of current research are featured.

334. *Work Group Dynamics and Leadership*. 3 HR. PR: Consent. Small group or individual research on topics related to leadership and group dynamics in the work environment including training and other human relations programs.

337. *Practicum in Industrial Interviewing*. 3 HR. PR: ILR 312 and consent. Experiential learning of industrial interviewing techniques covering legal and technical aspects of employment interviewing and other types of interviewing.

340. *Arbitration Theory and Practice*. 3 HR. PR: ILR 262 and consent. Study of the purpose of arbitration, trends, principles of contract construction, hearing procedure evidence, remedies, training and education of arbitrators, training of advocates, and decision writing. Students will arbitrate mock cases.

343. *Negotiation Strategy*. S, II. PR: Consent. Corequisite: ILR 262. Theory and practice of both principled negotiations and position bargaining; extensive role play and technique building exercises for individual and team negotiations; detailed preparation methods for all types of personal and professional negotiations.

344. *Benefits*. 3 HR. Considers employee benefits from the perspective of the industrial relations specialist who is responsible for articulating and administering a corporate program. Includes study of all benefits covered by major federal legislation.

345. *Equal Employment Opportunity Problems*. 3 HR. PR: Consent. A series of lectures by specialists in equal employment opportunity affairs. Lectures will include attorneys, directors of state and national EEO agencies, and representatives of business and industry and the labor movement.

391. *Advanced Topics*. 1-6 HR.

397. *Research*. 1-15 HR.

490. *Teaching Practicum*. 1-3 HR.

491. *Advanced Study*. 1-6 HR.

492. *Directed Study*. 1-6 HR.

493. *Special Topics*. 1-6 HR.

494. *Special Seminars*. 1-6 HR.

495. *Independent Study*. 1-6 HR.

496. *Graduate Seminar*. 1 HR.

497. *Research*. 1-15 HR.

498. *Thesis*. 2-4 HR.

499. *Graduate Colloquium*. 1-6 HR.

CORE Courses

Accounting (ACCT)

311. *Financial Accounting for Decision Making*. 3 HR. PR: Consent. Basic accounting assumptions and standards underlying financial statements, the significance of financial statement measurements, and the relevance of such data for planning and control. Emphasis on financial statement and cash-flow analysis.

Business Law (BLAW)

311. *Legal and Regulatory Environment*. 2 HR. PR: Consent. Examination of the legal environment in which business decisions are made and the response of the legal environment to change. Familiarization with the role of administrative agencies in the regulatory process.

Economics (ECON)

317. *Economic Decision Making*. 2 HR. PR: ECON 54 or consent. (Primarily for M.B.A. students.) Analysis of the firm as an optimizing unit operating in the market place. Examination of product demand, production and costs, pricing theory and practices, risk, and capital budgeting.

Finance (FIN)

311. *Managerial Finance*. 2 HR. PR: Consent. Analysis of the standard financial activities of the firm including: financial planning, structure of financing, and asset selection. Introduction to microcomputer problem solution.

Management (MANG)

301. *Organizational Behavior and Ethics*. 3 HR. PR: Consent. Interpersonal relationships through which administration becomes effective. Emphasis on human factors, but influences of economic and technological factors also are considered. Focus on ethics and importance of harmony between individual needs and organization goals.

311. *Management Information Systems*. 3 HR. PR: Consent. Examines computer technology, applications, information systems, and performance. Computer system planning, selection and implementation. Computer impact upon management, organization, and society from a managerial viewpoint.

321. *Operations Management/Applied Quantitative Analysis*. 3 HR. PR: Consent. Review of concepts, techniques and models encountered in manufacturing and service operations. Modeling approach and computer applications in operations management and management science are emphasized.

351. *Policy and Strategy*. 3 HR. PR: Consent. Capstone course. Integrates functional knowledge with strategy formulation and strategy implementation concepts. Cases of organizations varying in size, national affiliation, and profit orientation are analyzed with special emphasis on ethics and social responsibility.

Marketing (MKTG)

311. *Marketing Management*. 2 HR. Introduction to marketing management with specific emphasis on consumer behavior and market segmentation, product planning, promotion, distribution, and pricing.

College of Creative Arts

Philip J. Faini, M.M., Dean and Director

J. Bernard Schultz, Ph.D., Associate Dean for Academic Affairs

The College of Creative Arts, composed of the Divisions of Art, Music, and Theatre, serves an academic and cultural function and provides an educational and interdisciplinary environment for the exploration, advancement, and understanding of the visual and performing arts. The College boasts a distinguished faculty of actors, artists, composers, conductors, directors, instrumentalists, vocalists, and writers who bring to the college a commitment to a creative process of artistic growth which is shared with each student. Through teaching, research, and service, the faculty of the college provides students the professional preparation to achieve the highest level of performance, scholarly research, and creative activity.

Graduate programs in art, music, and theatre are characterized by quality and diversity of faculty, students, and curricular opportunity. Each division is an accredited member of the nationally recognized accrediting agency for professional instruction in the discipline: art programs by the National Association of Schools of Art and Design; music programs by the National Association of Schools of Music; and theatre programs by the National Association of Schools of Theatre.

The College of Creative Arts is committed to providing the highest levels of creative, intellectual, and cultural experiences in art, music, and theatre to the University, the state, and the region. In an environment rich with art exhibitions, concerts, and plays, students gain the knowledge, skills, experience, and inspiration necessary for professional success. Students, faculty, and visiting artists present a full calendar of performances and exhibitions which are open to the public.

The Creative Arts Center, which houses the college, is a modern, multimillion-dollar instructional and performance facility with three theatres, two recital halls/recording studios; scenery, painting, drawing, design, costume, printmaking, sculpture, ceramic, and instrumental studios; additional art studios; and two art galleries.

The Doctor of Musical Arts (D.M.A.) curricula in performance (piano, organ, voice, percussion, flute, oboe, clarinet, bassoon, horn, trumpet, trombone, tuba, violin, viola, cello, or double bass) or composition, and the Ph.D. curriculum in music prepare students for careers as teachers in higher education. The master of fine arts (M.F.A.) is a terminal degree in art and theatre that prepares students for careers in ceramics, graphic design, painting, printmaking, sculpture, acting, or theatre design/technology.

The master of music degree enhances undergraduate programs in performance, music education, theory, music history, and composition. The master of arts has concentrations in art education, art history, and studio art.

For further information, please contact:

Graduate advisor, Division of Art at (304) 293-2140 x 3141

Director of graduate studies in music, Division of Music at (304) 293-5511 x 3196

Chair, Division of Theatre at (304) 293-2020 x 3120

Our mailing address is College of Creative Arts, Creative Arts Center, West Virginia University, P.O. Box 6111 Morgantown, WV 26506-6111.

Special Admission Information

The College of Creative Arts offers graduate programs leading to terminal degrees in art, music, and theatre. Prospective students apply for admission through the University's Office of Admissions and Records. All candidates for graduate degrees must conform to University regulations for graduate study. Requirements for admission to specific programs are included in the program descriptions. Most programs require an audition or a portfolio review as a part of the admission process.

Full graduate assistants receive a stipend and remission of tuition. Approximately 11 graduate assistantships in art, 28 in music, and 14 in theatre are available each year. Application for these assistantships should be made to each division; the application deadline for art is March 1 and October 15, for music March 1, and for theatre April 1.

Graduate Programs

Art	M.A.
Music	M.M. D.M.A., Ph.D.
Theatre	M.F.A.
Visual Art	M.F.A.

Graduate Faculty

† Indicates regular membership in the graduate faculty.

* Indicates associate membership in the graduate faculty.

Art

Professors

†Robert P. Anderson, M.F.A. (Alfred U.). Ceramics.

*Eve Faulkes, M.F.A. (R.I. Sch. Design). Graphic design.

†Clifford A. Harvey, B.F.A. (Mpls. C. Art & Design). Graphic design.

†Alison Helm, M.F.A. (Syracuse U.). Sculpture.

†Margaret T. Rajam, Ph.D. (U. Mich.). Emerita.

†Bernard Schultz, Ph.D. (U. Pitt.). Associate Dean, Academic Affairs; Art history, Italian renaissance, Modern art, Art theory.

Associate Professors

*Victoria Fergus, Ph.D. (Purdue U.). Art education, Undergraduate advisor.

†Christopher Hocking, M.F.A. (LSU). Drawing, Painting, Printmaking.

†Paul Krainak, M.F.A. (North. Ill. U.). Painting, Graduate advisor.

†Sergio Soave, M.F.A. (WVU). Interim Chairperson, Printmaking.

†William J. Thomas, Ph.D. (Penn St. U.). Art education.

Assistant Professors

*Iain Machell, M.F.A. (SUNY-Albany). Visual Foundations, Sculpture.

Janet Snyder, Ph.D. (Columbia University). Art history, Medieval art, Native American art, Women in Art.

Adjunct Assistant Professor

Kristina Olson, M.A. (SUNY-Stony Brook). Art Criticism and Contemporary Art. Curator.

Music

Professors

†Peter Amstutz, D.M.A. (Peabody Conserv.) Coordinator, Keyboard instruments. Piano.

†John Beall, Ph.D. (U. of Rochester, Eastman Sch. of Mus.). Composition, Theory.

†Philip J. Faini, M.M. (WVU). Dean and Director, College of Creative Arts. Percussion, African music.

†William P. Haller, D.M.A. (N. Tex. St. U.). F.A.G.O. Organ, Theory.

†Barton Hudson, Ph.D. (Ind. U.). Musicology, Renaissance music.

†Christine B. Kefferstan, D.M.A. (U. Cincinnati). Piano.

†Gerald Lefkoff, Ph.D. (Cath. U. Am.). Theory, Electronic music, Viola.

†James E. Miltenberger, D.M.A. (U. Roch.-Eastman Sch. of Mus.). Piano, Piano repertoire, Jazz.

†Augusto Paglialunga, M.M. (New England Conserv.). Voice.

Timothy Peterman, D.M.A. (U. North Tenn). Coordinator, Percussion studies.

†William Skidmore, M.M. (U. Ill.). Coordinator, Stringed instruments, Cello.

†Gilbert Tryhall, D.M.A. (Cornell U.). Composition, Electronic music, Theory.

†John F. Weigand, D.M.A. (Florida St. U.). Coordinator, Woodwind instruments. Coordinator, Undergraduate admissions; Clarinet, Chamber music.

- †Don G. Wilcox, M.A. (Cal. St. at Long Beach). Director of Bands. Coordinator, Conducting.
- *Cecil B. Wilson, Ph.D. (Case West. Res. U.). Assistant Vice President for Faculty Development. Musicology, 19th Century Music, Orchestration.

Associate Professors

- †David Bess, Ph.D. (WVU). Coordinator, music education. Instrumental music education.
- *Joyce A. Catalfano, M.M. (Ithaca Col.). Flute, Chamber music.
- *John E. Crotty, Ph.D. (U. Roch.-Eastman Sch. of Mus.). Coordinator, Theory-Composition, Theory, Analysis.
- †Terry B. Ewell, M.A. (U. Wash.). Chairperson. Bassoon, Theory.
- *Curtis Johnson, M.M. (WVU). Saxophone, Jazz.
- *Janis-Rozena Peri, M.M. (Miami U.). Voice.
- †Janet Robbins, Ph.D. (Ohio State U.). General music education.
- †Connie Sturm, Ph.D. (U. Oklah.). Piano, Group piano, Piano pedagogy.
- †Robert H. Thieme, Jr., M.M. (WVU). Director, WVU Opera Theatre; Coordinator, Voice studies. Opera, Vocal repertoire, Accompanying, Coaching.
- †Virginia Thompson, D.M.A. (U. Iowa). Director of Graduate Studies; Horn, Chamber music.
- †Christopher Wilkinson, Ph.D. (Rutgers U.). Coordinator, Music History-Literature. Musicology, 20th-century music.
- *John Winkler, D.Mus. (Northwestern U.). Coordinator, Brass and percussion instruments. Trumpet, Theory, Chamber music.

Assistant Professors

- *Cynthia Anderson, M.M. (Manhattan School). Oboe, Chamber music.
- †John Fadial, M.M. (U. Roch.-Eastman Sch. of Music). Violin, Chamber music.
- †H. Keith Jackson, D.M.A. (Arizona State U.). Trombone, Jazz.
- †Peter Lightfoot, Prof. Cert. (Julliard Sch. Mus.). Voice.
- *Paul Scea, M.M. (U. of Iowa). Director, Jazz Studies.
- †Kathleen Shannon, D.M.A. (U. Fl.). Director of Choral Activities. Choral music education, Conducting.
- †Molly Weaver, M.M. (U. Mich.). Music education.

Adjunct Assistant Faculty

- *Carol Beall, M.M. (Texas Tech U.). Part-time; Piano.
- *Mary Ferer, Ph.D. (U. of Illinois). Part-time; History, Appreciation.
- *Andrew Kohn, Ph.D. (U. of Pittsburgh). Part-time; Double Bass, Theory, Analysis.

Theatre

Professors

- †Frank Gagliano, M.F.A. (Columbia U.). Claude Worthington Benedum Professor. Playwriting.
- †Joann Spencer-Siegrist, M.F.A. (U. Ga.). Puppetry, Creative drama.
- †John C. Whitty, Ph.D. (U. Iowa). Theatre history.
- †M. Kathryn Wiedebusch, M.A. (WVU). Dance.

Associate Professors

- †W. James Brown, M.F.A. (U. Wash.). Theatre design.
- *Theresa Davis, M.F.A. (Virginia Commonwealth U.). Acting.
- †Jerry McGonigle, M.F.A. (Am. Conserv. Theatre). Acting.
- †Victor McQuiston, M.F.A. (Ohio St. U.). Technical direction.
- †Linda D. Milian, M.F.A. (Rutgers U.). Costuming.
- †Joseph Olivieri, M.F.A. (Am. Conserv. Theatre). Acting, Directing.
- †William J. Winsor, M.F.A. (Ohio St. U.). Chairperson, Scenic design.

Assistant Professors

- *Julie Booth, M.F.A. (U. Tenn-Knoxville). Visiting. Theatre lighting design.
- *Margaret McKowen, M.F.A. (Univ. of Texas, Austin). Costume design.
- Thomas O'Connor, M.F.A. (Ohio State Univ.). Acting/Movement.
- Katherine Udall, M.F.A. (UC San Diego). Acting/Voice.

Art

Paul Krainak, Graduate Advisor, Division of Art
419-A Creative Arts Center

Degrees Offered: Master of Arts, Master of Fine Arts

The graduate programs in art lead to a master of arts with emphasis in art, art education, or art history (one to two years or 30 credit hours) and to a master of fine arts with emphasis in visual art (two to three years or 60 hours). Both of these programs are highly selective and closely integrated parts of the professional education in art offered by the Division of Art. All applicants are expected to have artistic maturity and the motivation to achieve excellence in their areas of concentration.

Accreditation

The Division of Art is an accredited institutional member of the National Association of Schools of Art and Design, the only nationally recognized accrediting agency for professional art instruction. Applicants to programs in art must comply with the standards for admission set by West Virginia University, the College of Creative Arts, and the Division of Art.

Master of Fine Arts

The master of fine arts is the terminal degree in studio art; it prepares students for professional practice in art. Our selective and limited enrollment insure regular individual contact with a dedicated, diverse faculty, who are committed to a sustained professional exchange with each student. A collaboratively designed curriculum is augmented by weekly critiques engaging all studio majors and faculty. Media experimentation is encouraged. Students must be able to apply and communicate a diverse body of knowledge relating historical, cultural, contemporary, and aesthetic issues to their professional practice. Students are expected to articulate and defend their position within the context of contemporary art discourse.

Master of Arts

Master of Arts students in studio art, art education, or art history critically study, explore, and evaluate their chosen content area, ensuring a solid foundation for further professional practice or research.

Reviews

All students enter the graduate programs in art as preliminary candidates. Students in the M.F.A. program are reviewed for advancement at the end of their first year of study or upon the completion of 24-30 credit hours. Students in the M.A. program are reviewed at the end of their first semester of study or upon the completion of 12-15 credit hours. A satisfactory review allows students to have degree candidate status. Candidacy status must be approved by the student's graduate committee. All students in degree programs, either M.F.A. or M.A., must prepare a written thesis. A graduate exhibition is required of all M.F.A. students.

Deficiencies

Before students are admitted, they must meet any deficiencies in their undergraduate preparation. Credits taken to erase deficiencies do not count toward a graduate degree.

The Division of Art has high expectations for its graduate students. Because of this, certain standards of achievement exceed the minimum standards set by the University for all graduate students. The Division of Art reserves the right to impose stricter limitations on all

art graduate students. **Credit hours in courses with an earned grade of "C" do not automatically count toward graduate degree requirements.** The graduate committee and the divisional chairperson have the right to declare such credit hours unacceptable.

Supplies

All graduate art majors are required to purchase most of their personal equipment and expendable supplies. Some studio areas purchase bulk supplies for student use in their courses from an art fee.

Thesis

All candidates for a graduate degree in art must prepare a written thesis (or graduate project) related to their work and activity as a graduate student. The chairperson of the student's graduate committee supervises the preparation of the thesis, which must be completed at least one month before the anticipated graduation date. The thesis must be prepared according to the form prescribed in the WVU regulations governing the preparation of dissertations and theses as well as divisional guidelines, unless an exception is authorized in advance by the student's graduate committee and the division chairperson.

Program Transfer

A preliminary candidate in a graduate art program is not guaranteed acceptance into another graduate art program. A change from the M.F.A. program to the M.A. program (or the reverse) must be approved by the graduate faculty of the Division of Art. Under normal conditions, such a change is not considered until the student has established credibility by successfully completing 12-15 approved credit hours of study at WVU. A change to a program outside the Division of Art must be approved by the receiving unit. To make an application for a double degree program or special interdepartmental programs at the graduate level, students must have written prior approval of the division chairperson.

Admission Requests for application forms for admission to graduate degree programs in art must be addressed to the Office of Admissions and Records, West Virginia University, P.O. Box 6009, Morgantown, WV 26506-6009. Applicants must specify the degree and subject area of their choice and return the application and transcripts from each college or university previously attended to the above address with a \$25 nonrefundable processing fee.

Portfolio All applicants for both the M.F.A. and the M.A. (studio and art education) must present a portfolio for admission to the Division of Art. Applicants for art history must submit a copy of a written research project. Applicants should take care to select slides of recent and representative work for inclusion in the portfolio. The portfolio must contain a statement of purpose, and three letters of recommendation from college faculty or persons knowledgeable of the applicant's interests and abilities, and twenty 35mm slides. Each slide should be labeled with name, date of completion, size of work, and type of medium and arranged in a plastic slide holder for mailing. The complete portfolio, with the purpose statement, three letters, and 20 slides, should be submitted to: Graduate Advisor, Division of Art, College of Creative Arts, West Virginia University, P.O. Box 6111, Morgantown, WV 26506-6111. Provide a stamped, self-addressed envelope to assure prompt, safe return of the slides.

Master of Fine Arts in Visual Arts

The Master of Fine Arts, a professionally-oriented terminal degree in the studio arts, requires a baccalaureate degree in art or its equivalent for admission. Preparation should include 12 hours of art history, 70 hours of studio art related to professional needs, and 36 hours of general education. The suggested distribution of studies for the 60 credit hour program is:

Art studio major area	36 Hr.
Art studio elective	6 Hr.
Teaching practicum/Professional practice	3 Hr.
Graduate seminar (or approved elective)	3 Hr.
Art history	6 Hr.
Graduate exhibition and thesis	6 Hr.

To earn the M.F.A., a student must complete a combined (undergraduate and graduate) total of 118 hours in studio, 18 hours in art history, and the appropriate number of credit hours in general education courses.

All students in the M.F.A. program are required to submit a statement of intention after completion of 12 credit hours, to indicate the direction and implementation of their studio involvement.

Transfers In addition to the application materials listed, transfer students must ask to transfer graduate work completed elsewhere. Transcripts must accompany the written request. Transfer credit is not automatic. The art faculty review committee, the graduate advisor, and the division chairperson will determine how much, if any, previous graduate-level work may be transferred. At least 60 percent of the work for the M.F.A. must be completed at WVU in the studio arts.

Residence Requirements The M.F.A. student must complete the stated requirements in order to graduate, usually in a two-year period. Most students take 15 hours per semester. All students accepted into the M.F.A. program are required to spend four full-time semesters (excluding summer sessions) in residence. Concentrations for the M.F.A. include ceramics, graphic design, painting, printmaking, and sculpture.

Course Distribution

The following is the recommended distribution of required M.F.A. courses:

First Year—Preliminary Candidate

Art studio major area	18 Hr.
Art studio elective	3 Hr.
Graduate seminar	6 Hr.
Art history*	3 Hr.
Total	30 Hr.

*Graduate credits in art history must be at the 300-level (graduate) and are in addition to courses taken or required at the undergraduate level.

Second Year—M.F.A. Candidate

Art studio major area	18 Hr.
Art studio elective	3 Hr.
Art history*	3 Hr.
Graduate exhibition and thesis**	6 Hr.
Total	30 Hr.

*Graduate credits in art history must be at the 300-level (graduate) and are in addition to courses taken or required at the undergraduate level.

**Graduate exhibition and thesis (Art 400) will include organized graduate seminars, committee meetings, and exhibition preparation discussions.

Master of Arts in Art Education

Art education is a popular option for graduate study in art. Specialization in art education requires the completion of 30 credit hours program. The exact course of study is determined through consultation with the student's advisor. The art education concentration may be completed in one year of full time study. The general distribution of graduate credits is as follows:

Art studio major area	9 Hr.
Art studio elective	6 Hr.
Art education or approved studies	12 Hr.
Art 402 Master's in Art Education Project	3 Hr.
Total	30 Hr.

Every graduate student is required to complete a graduate project. The graduate art faculty recommend those students who may be required to hold a graduate exhibition.

Master of Arts in Art History

The art history concentration is accredited by the National Association of Schools of Art and Design. For information about this option, please contact the coordinator of art history or the graduate advisor in the Division of Art. The general distribution of graduate credits for a concentration in art history is as follows:

Art history	21 Hr.
Cognate courses	6 Hr.
Art 401 (thesis)	3 Hr.
Total	30 Hr.

Master of Arts in Studio Art

The studio art concentration allows students to specialize in ceramics, graphic design, painting, printmaking, or sculpture.

Applicants desiring to begin a course of study leading to the Master of Arts in Art and concentration in the studio arts must have a baccalaureate degree in art or the equivalent. Undergraduate study should include 12 hours of art history, 45 hours of studio art related to professional needs, and 36 hours of general education courses.

The concentration in studio art requires:

Art studio major area	18 Hr.
Art studio elective or graduate seminar*	3 Hr.
Art history**	6 Hr.
Art 401 (thesis)	3 Hr.
Total	30 Hr.

*In lieu of art studio elective instruction, students may take the graduate seminar course. Exact courses of study are determined in consultation with the graduate advisor.

**Graduate credits in art history must be at the 300-level (graduate) and are in addition to courses taken or required at the undergraduate level.

Requirements

The student must complete the stated degree requirements in order to graduate. These credits can be earned in one year. After consultation with the graduate advisor, students specializing in studio arts are required to prepare a study list of courses to be taken to satisfy Division of Art requirements. Changes in this list must be requested in writing and approved by the chairperson of the division.

Financial Aid

Financial aid information is available through the Student Financial Aid Office, West Virginia University, P.O. Box 6004, Morgantown WV 26506-6004. Graduate assistantships in art are awarded to students of exceptional promise by the faculty of the Division of Art. Application forms must be requested from the graduate advisor, Division of Art, College of Creative Arts, West Virginia University, P.O. Box 6111, Morgantown, WV 26506-6111, and submitted with the portfolio.

Art (ART)

200. *Independent Study Studio*. I, II. 1-15 HR. Intensive self directed research involving special projects in studio production. Areas of study include, but are not limited to, painting, drawing, printmaking, sculpture, ceramics, and design.

201. *Independent Study Art History*. I, II. 1-15 HR. This class concentrates upon independent research, closely supervised, on a topic of students selection. This must be well-defined and contain historical, critical, and theoretical issues. Contractual course.

211. *Figure Drawing*. I, II, S. 3 HR. PR: ART 12 and ART 121. This class concentrates on compositional structure from the human figure. Students will investigate the organic nature of the figure and its representation in space using a wide variety of media and processes. (May be repeated for credit.)

212. *Advanced Drawing*. I, II, S. 3 HR. PR: ART 211. This class expands media possibilities, and examines the variables of image-making while establishing personal expression. The course is designed to developing analytical and problem solving skills as well as technical processes. (May be repeated for credit.)

213. *Painting*. I, II, S. 1-15 HR. The course reaffirms and expands formal criteria established in 113 and 114 and directs individual research into personal, historical, and contemporary painting issues in oil, acrylic, and related media. (May be repeated for credit.)

223. *Graphic Design*. I, II. 1-12 HR. Varied hypothetical projects give students a methodology for solving applied design projects in a range of formats. This class will deal with a combination of computer graphics, book arts, publication design, and multi-media projects. Portfolio review. (May be repeated for credit.)

224. *Graphic Design*. I, II. 1-9 HR. Senior graphic design studio includes a model studio with real clients and projects, most of which are produced and printed. Emphasis is on developing professional skills in design and design management. (May be repeated for credit.)

225. *Graphic Design/Senior Project*. I, II. 3 Hr. This course is focused on the development of an undergraduate thesis in which each project is individually defined with an umbrella topic. Formats and content vary but each project culminates in a thesis exhibition and an individual audio/ visual presentation. (May be repeated for credit.)

226. *Sculpture*. I, II, S. 1-15 HR. Students continue to examine personal iconography as it pertains to aspects of contemporary sculpture. Topics explored are concept-oriented, using stone, concrete, glass, and emphasizing craftsmanship and aesthetic issues. (May be repeated for credit.)

227. *Installation Art*. I, II, S. 1-15 HR. Students investigate this contemporary art form through a series of temporary, site-specific sculptural environments. Conventional art media and concepts are challenged as students develop alternative solutions to creative problems. (May be repeated for credit.)

230. *Printmaking*. I, II, S. 1-15 HR. An exploration of color printmaking, advancing imagery through critical contexts. Students focus on technical mastery in lithography, intaglio, relief, and alternative processes, expand their knowledge of printmaking's history and develop creative problem solving skills. (May be repeated for credit.)

232. *Alternative Photography*. I, II, S. 1-15 HR. Alternative photography emphasizes creating and manipulating images from and for the camera. Techniques include the traditional silver gelatin print, cyanotypes, liquid light, and gum bichromate. A basic knowledge of photography is recommended. (May be repeated for credit.)

233. *Photo Design*. I, II, S. 3 HR. Emphasis is placed on the use of large and small format cameras, studio photography, darkroom techniques, and lighting. Projects are developed to complement the graphic design studio courses by exploring indoor and outdoor assignments.

240. *Ceramics*. I, II, S. 1-15 HR. This intense studio concentration is designed to prepare students for graduate studies and/or professional studio practices. Historical and contemporary design issues, kiln design and building, firing, glaze and clay formulation, studio practices and advanced level throwing and hand building techniques will be studied. (May be repeated for credit.)

245. *Greek and Roman*. I, II. 3 HR. The arts of the Aegean world, c. 2000 BCE, Greece and Rome to 400 CE. are examined. The visual examples will be considered critically examined. Architecture, sculpture, and painting will be included.

246. *Medieval Art*. I, II. 3 HR. The arts of Europe from c. 312 to c. 1350 are examined. The theoretical, historical, and literary contexts for the images will be established. Architecture, sculpture, painting, and portable arts will be included.

247. *Northern Renaissance*. I, II. 3 HR. The arts of Northern Europe from 1350 to 1560 will be studied in a historical and theoretical context. Painting and sculpture will be the focus of study.

248. *Italian Renaissance*. I, II. 3 HR. Early Renaissance through Mannerism. The course will emphasize both the historical context and theoretical foundation of 15th and 16th-century Italian art and architecture.

249. *Baroque*. I, II. 3 HR. The course examines art of the late 16th through early 18th centuries, both Northern and Southern European examples. Issues of historical context and theoretical interpretation are emphasized.

250. *Nineteenth Century*. I, II. 3 HR. The course focuses upon European and American art from the late 18th C. through 1900. Issues of theory, historical, context and literary foundation will be considered.

251. *Modern*. I, II. 3 HR. The revolutionary experience of modern art, from its foundation in 19th-century European movements through the 1950's will be emphasized. Critical theory and historical context stressed.

252. *American*. I, II. 3 HR. The course will treat the arts in the United States from the Colonial era to 1960. Emphasis is placed upon factors which define American art and the critical foundations for the works.

253. *Contemporary*. I, II. 3 HR. The course explores the various artistic movements from World War II to the present. Emphasis will be given to the change from modern to postmodern. Familiarity with images and critical texts is expected.

254. *Art Theory*. I, II. 3 HR. The course will examine development and tradition of the literature of art theory and its relationship to artistic practice.

255. *Women in Art*. I, II. 3 HR. The course examines the art of female artists and of women as subjects in art. There will be a historical view with concentration on 20th-century work. Critical theories are emphasized.

265. *Pre-Student Teaching*. I, II. 3 HR. PR: ART 165 and ART 166. The course concentrates on curriculum development, research methods, and delivery strategies for K-12 art specialists preparing for their professional semester.

291. *Special Topics: Art*. I, II, S. 3 HR. The class presents occasional topics not otherwise treated within the regularly scheduled courses and may include photography, design, architecture, and criticism among others.

295. *Senior Seminar*. I, II, S. 3 HR. The focus of this seminar is analysis of theoretical and professional studio issues as well as trends in contemporary art practice and criticism. Emphasis will be on comparative media, interdisciplinary forms of expression and significant cultural concerns outside of visual arts practice. Topics will be coordinated and involve the Visiting Artist Series.

300. *Independent Study Graduate Studio*. I, II, S. 1-15 HR. (May be repeated for credit.) PR: Consent. Intensive self directed research involving special projects in studio production. Areas of study include, but are not limited to, painting, drawing, printmaking, sculpture, ceramics, and design.

301. *Independent Study Art History*. I, II, S. 1-15 HR. (May be repeated for credit.) PR: Consent. Independent research, closely supervised, on topic of student's selection. Proposal must be well-defined and contain historical, critical, and theoretical issues. Contractual course.

313. *Graduate Painting*. I, II, S. 1-15 HR. (May be repeated for credit.) PR: Consent. Encompasses the significant issues and developments of contemporary painting, including visual resources, critical and pictorial structures, and technical proficiency to establish a coherent aesthetic vision in the medium.

323. *Graduate Graphic Design*. I, II, S. 1-15 HR. (May be repeated for credit.) PR: Consent. Integration of current and historic design resources leading to the development of a thesis project while working within the independent and existing design courses. Areas of special interest include the book arts and electronic multi-media.

324. *Graduate Graphic Design/Professional Practice*. I, II, S. 1-6 HR. (May be repeated for credit.) PR: Consent. Students assist and work on projects in a Model Studio setting, helping to coordinate and manage communication with clients, printers, and undergraduate students in Graphic Design Studio 222.

326. *Graduate Sculpture*. I, II, S. 1-15 HR. (May be repeated for credit.) PR: Consent. Encompasses the significant issues and developments of contemporary 3-dimensional form, including visual resources, critical and historic foundations, and technical proficiency designed to establish a coherent comprehension of the media.

330. *Graduate Printmaking*. I, II, S. 1-15 HR. (May be repeated for credit.) PR: Consent. Encompasses the germane aspects of contemporary printmaking including visual resources, theoretical and historic structures, and technical processes, designed to establish a rigorous comprehension of the medium. Areas of specialization include lithography, intaglio, relief, serigraphy and electronic media.

332. *Graduate Photography*. I, II, S. 1-15 HR. (May be repeated for credit.) PR: Consent. Involves the essential problems and developments of current photography, from traditional to digital photo processes, theoretical and pictorial foundations and technical proficiency designed to afford a coherent aesthetic vision in the medium.

334. *Alternative Media*. I, II, S. 1-15 HR. (May be repeated for credit.) PR: Consent. Involves the primary issues and developments of alternative and interdisciplinary media such as installation, video, performance art, or hand-made books along with the critical foundation and technical proficiency to establish a comprehensive utilization of chosen forms.

340. *Graduate Ceramics*. I, II, S. 1-15 HR. (May be repeated for credit.) PR: Consent. Involves the essential concerns and developments of contemporary ceramics, including traditional and current practices. Emphasis is on technical processes designed to provide a rigorous comprehension and expression in clay. Area of specialization include both functional and sculptural ceramics.

345. *Greek and Roman*. I, II. 3 HR. PR: Consent. The architecture, sculpture, and paintings of the Aegean world, c.2000 BCE, Greece and Rome to 400 CE. Critical and historical consideration of this time period will be considered.

346. *Medieval Art*. I, II. 3 HR. PR: Consent. The arts of Europe from c. 312 to c. 1350. The theoretical, historical, and literary contexts for the images will be established. Architecture, sculpture, painting, and portable arts will be included.

347. *Northern Renaissance*. I, II. 3 HR. PR: Consent. The arts of Northern Europe from 1350 to 1560 will be studied in an historical and theoretical context. Painting and sculpture will be the focus of study.

348. *Italian Renaissance*. I, II. 3 HR. PR: Consent. Early Renaissance through Mannerism. The course will emphasize both the historical context and theoretical foundation of 15th and 16th century Italian art and architecture.

349. *Baroque*. I, II. 3 HR. PR: Consent. Art of the late 16th through the early 18th centuries, both Northern and Southern European examples. Issues of historical context and theoretical interpretation will be emphasized.
350. *Nineteenth Century*. I, II. 3 HR. PR: Consent. European and American art from the late 18th through 1900. Issues of theory, historical context and literary foundation will be considered.
351. *Modern*. I, II. 3 HR. PR: Consent. The revolutionary experience of modern art, from its foundation in 19th century European movements through the 1950's. Critical theory and historical context will be stressed.
352. *American*. I, II. 3 HR. PR: Consent. The arts in the United States from the Colonial era to 1960. Emphasis placed upon factors which define American art and the critical foundations for the works.
353. *Contemporary*. I, II. 3 HR. PR: Consent. Exploration of the various artistic movements from World War II to the present. Emphasis will be given to the change from modern to postmodern. Familiarity with images and critical texts will be expected.
354. *Art Theory*. I, II. 3 HR. PR: Consent. Examination of the development and tradition of the literature of Western art theory and its relationship to artistic practice.
355. *Women in Art*. I, I. 3 HR. PR: Consent. Examination of the art of female artists and of women as subjects in art. An historical view with concentration on 20th century work. Critical theories will be emphasized.
356. *Twentieth Century Architecture*. S. 3 HR. PR: Consent. History of 20th Century architecture focuses on development of the International Style and recent challenges to this modernist aesthetic.
365. *Graduate Art Education Studies*. I, II, S. 1-12 HR. (May be repeated for credit.) PR: Consent. Studies in art education and related areas. The development of a master's degree project in conjunction with a faculty committee.
400. *Graduate Exhibition/Thesis*. I, II, S. 3-6 HR. PR: Consent. Graduate Exhibition and Thesis. Research will be directed towards the production of a solo exhibition and a written thesis which documents the processes and philosophical principles of the artwork.
401. *Art History Thesis*. I, II, S. 3 HR. PR: Consent. Topic selected by student in consultation with art history faculty. Research must indicate familiarity with primary and secondary sources and regard for evidence of art historical research, methodology, and criticism.
402. *Master's in Art Education Project*. I, II, S. 3-9 HR. PR: Consent. This course is for the final three hours of the master's project. The in-depth project is to be completed and then approved and signed by the advising committee.
490. *Teaching Practicum/Professional Practice*. I, II. 3 HR. PR: Consent. Supervised practices in college teaching. This course is designed to develop aspects of college teaching experience such as writing a syllabus, organizing a classroom, or improvising with materials or topical issues.
496. *Graduate Seminar*. I, II. 1 HR. PR: Consent. Issues in Contemporary Art. The focus of this seminar is on analysis of theoretical issues and trends in contemporary art criticism. Emphasis is on comparative media, interdisciplinary forms of expression, and significant cultural concerns that affect of visual arts practice.

Music

Virginia Thompson, Graduate Advisor, Division of Music
416-A Creative Arts Center

Degrees Offered: Master of Music, Doctor of Musical Arts, Doctor of Philosophy

The Division of Music is an accredited institutional member of the National Association of Schools of Music, the only nationally recognized accrediting agency for professional music instruction. All programs comply with the objectives and guidelines required by this organization.

Prospective graduate students in music are required to have completed the appropriate curriculum of undergraduate study in music at WVU or its equivalent at another institution of recognized standing. For acceptance into a degree program the applicant should make inquiry to the Director of Graduate Studies, Division of Music, P.O. Box 6111, Morgantown, WV 26506-6111.

Applicants accepted for degree study must take diagnostic tests in music theory and music history, and must audition on piano. In addition, performance majors take diagnostic tests in pedagogy and literature. The results of these tests may indicate the need for remedial study, which must be completed before admission to candidacy.

Master of Music

The degree of master of music may be taken in performance, music education, composition, music theory, or music history. Performance majors may specialize in piano, piano pedagogy, organ, voice, percussion, flute, oboe, clarinet, bassoon, saxophone, horn, trumpet, trombone, tuba, violin, viola, cello, double bass, guitar, or conducting.

Admission Applicants to the program leading to the degree of Master of Music must present necessary credentials for evaluation of previous training and experience to the Division of Music. These include scores on the Graduate Record Examination General Aptitude Test (required only for music theory or music history applicants) and undergraduate transcripts showing an average of at least 3.0 grade-point average in all undergraduate study, submitted through the WVU Office of Admissions and Records. Three letters of recommendation from individuals qualified to judge the applicant's potential success as a graduate student in music must be submitted directly to the Director of Graduate Studies in Music.

Applicants are also required to demonstrate, by audition or tape recording, the level of attainment in a principal performance area, which is a prerequisite to the curriculum sought. The evaluation of performance proficiency is based on technical ability, repertoire, and musicianship. A listing of representative material for each performance area, graded by proficiency level, is available upon request. The audition for acceptance as a degree student, when required, is assessed for general admission purposes. For performance majors, the estimated proficiency level must be confirmed by a jury examination at the end of the first semester of performance study. Credit in performance may be counted toward degree requirements only after the proficiency level prerequisite has been reached.

Applicants seeking admission as composition majors must submit representative compositions for evaluation and approval.

Applicants seeking admission as music education, theory, or history majors must submit a sample of writing, such as a term paper: a musical subject is recommended, but not required.

Applicants to music education curricula (with the exception of the certification option) must also submit a videotape of teaching, preferably of a K-12 music class.

Provisional Admission

Applicants whose averages and test scores do not meet the qualifications outlined above may be considered for acceptance as provisional or non-degree students. If, upon completion of up to 12 semester hours of graduate study, they have achieved a minimum of a B (3.0) average, and after any previous undergraduate deficiencies or other conditions have been satisfied, such students may be accepted as degree students.

Music Education Options

Students majoring in music education will be allowed one of four options, to be determined in consultation with the program consultant:

- Thesis option;
- Recital option (if the candidate demonstrates proficiency level 8 in the major performance area within the first 12 hours of enrollment);
- Thirty-six hour course work option; and
- Certification option (intended for persons possessing a bachelor's degree with a major in music other than music education), leading to eligibility for certification for teaching grades K-12 in the public schools of West Virginia.

For the first three options, the following requirements apply:

- Thirty graduate hours for thesis and recital options, 36 graduate hours otherwise, with a minimum average of 3.0.
- For the thesis or 36-hour options, four hours of performance, either MUSC 400 (principal performance area) or MUSC 310 (secondary performance area.)
- Demonstration of the ability to integrate music history, music theory, and music education by passing a comprehensive oral examination.
- Successful completion of a four-credit thesis or two-credit recital for the thesis and recital options, respectively.

For the certification option, a combination of graduate and undergraduate courses will be selected to satisfy certification requirements. The 36 graduate hours include 12 hours of graduate music education courses and electives chosen to provide a good background for teaching. Undergraduate courses may be necessary to make up deficiencies.

Requirements

History of Music

PR: Level 7 in the major performance area; Level 4 in piano; four semesters of a foreign language; seven hours upper-division theory; 15 undergraduate hours in music history.

MUSC 430 <i>Introduction to Music Bibliography</i>	3 Hr.
Music History, chosen from MUSC 221-227	6 Hr.
MUSC 491 <i>Special Topics</i>	6 Hr.
Theory Elective	3 Hr.
MUSC 497 <i>Research</i> (Thesis)	4 Hr.
Electives (at least four credits in music)	8 Hr.
Total	30 Hr.

Music Education

PR: Level 2 in piano.

Music Education courses at the 300 or 400 level*	12 Hr.
One theory course and one music history course	5-6 Hr.

For Thesis Option:

MUSC 400 and/or 310 <i>Performance</i>	4 Hr.
MUSC 497 <i>Research</i> (Thesis)	4 Hr.
Electives	4-5 Hr.

For Recital Option:

MUSC 398 <i>Master's Recital</i>	2 Hr.
MUSC 400 <i>Performance</i> (major performance area)	6 Hr.
Electives	4-5 Hr.

For 36-hour Option:

MUSC 400 and/or 310 <i>Performance</i>	4 Hr.
Electives	14-15 Hr.
Totals	30 or 36 Hr.

*Students in the thesis option must include MUSC 446.

Performance

PR: Level 10 in the major performance area, and Level 3 in piano; for organists, Level 5 in piano; for pianists in the piano pedagogy option, Level 9 in piano and one year of piano pedagogy/group or equivalent teaching experience; for voice majors, the same language requirements as for the B.M. degree.

MUSC 400 <i>Performance</i> (major performance area)	8 Hr.
MUSC 430 <i>Introduction to Music Bibliography</i>	3 Hr.

For Traditional Performance Option:

MUSC 398 <i>Master's Recital</i>	4 Hr.
One of the following	2 Hr.
MUSC 398 <i>Master's Recital</i>	
MUSC 431 <i>Research Problems for Performers</i>	
One theory course and one music history course	
(chosen from Music 221-227)	5-6 Hr.
Music electives	
(no more than four hours in the major performance area)	7-8 Hr.
Total	30 Hr.

For Piano Pedagogy Option:

MUSC 398 <i>Master's Recital</i>	2 Hr.
MUSC 312 <i>Studies in Keyboard Performance and Pedagogy</i>	6 Hr.
MUSC 392 <i>Guided Studies</i> (Teaching internship)	4 Hr.
One theory course or one music history course	2-3 Hr.
Music electives	4-5 Hr.
Total	30 Hr.

For Conducting Option:

MUSC 398 <i>Master's Recital</i>	6 Hr.
MUSC 410, 411 <i>Conducting Seminars</i>	6 Hr.
MUSC 333, 334, or 335 <i>Studies in Vocal/Instrumental Music</i>	3 Hr.
MUSC 440 or 442 <i>Studies in Choral/Instrumental Techniques</i>	2 Hr.
MUSC 467 <i>Analytical Techniques</i>	3 Hr.
MUSC History/Theory Electives	2 Hr.
Total	33 Hr.

Composition

PR: Level 8 in the major performance area; Level 4 in piano; evaluation of previously completed compositions at a graduate major level.

MUSC 430 <i>Introduction to Music Bibliography</i>	3 Hr.
MUSC 460 <i>Composition</i>	6 Hr.
MUSC 475 <i>Pedagogy of Theory</i>	3 Hr.
MUSC 470 <i>Transcription and Arranging</i>	3 Hr.
MUSC 468 <i>Compositional Tech. in Contemporary Music</i> or	
MUSC 483 <i>Theory Topics</i>	3 Hr.
MUSC 497 <i>Research</i> (Thesis)	4 Hr.
	21 Hrs.

Music electives (must include two of the following: 9 Hr.	
MUSC 460 <i>Composition (Electronic Music)</i>	
MUSC 467 <i>Analytical Techniques</i>	
<i>A Music History or Literature Course</i>	
Total	30 Hr.

Theory

PR: Level 8 in the major performance area; Level 4 in piano.

Music 430 Introduction to Music Bibliography	3 Hr.
Graduate music history	3 Hr.
MUSC 467 <i>Analytical Techniques</i>	3 Hr.
MUSC 468 <i>Compositional Techniques in Contemporary Music</i>	3 Hr.
MUSC 475 <i>Pedagogy of Theory</i>	3 Hr.
MUSC 483 <i>Theory Topics</i>	3 Hr.
MUSC 497 <i>Research (Thesis)</i>	4 Hr.
Electives (at least four credits in music)	8 Hr.
Total	30 Hr.

Additional Requirements

Master's degree students must establish an overall grade-point average of 3.0.

A representative public recital is required of candidates majoring in performance. Composition majors must submit as a thesis a composition in a large form. All candidates for the master of music degree are required to participate for credit for two semesters (or summer sessions) in a performing group which meets at least two clock hours per week and which is selected with the advisor's approval.

A general comprehensive oral examination must be passed by all candidates for the master of music degree. Unsuccessful candidates may repeat this examination after a three-month period. The results of the second oral examination will normally be considered final. The examining committee will decide immediately after an unsuccessful second attempt whether a petition for a third attempt will be granted.

Students must complete their programs in eight calendar years. Failure to do so will result in the loss of credit for courses taken at the outset of the program.

Doctor of Philosophy

The doctor of philosophy curriculum in music education prepares students for careers as teachers in higher education. Acceptance into the doctoral program is competitive. Applicants to the program leading to the degree of Doctor of Philosophy must present necessary credentials for evaluation of previous training and experience to the Division of Music. These include transcripts showing an average of at least a 3.0 grade-point average in a minimum of 28 hours in liberal arts studies, submitted through the WVU Office of Admissions and Records. A sample of writing (such as a term paper), a videotape of teaching (preferably of a K-12 music class), and three letters of recommendation from individuals qualified to judge the applicant's potential success as a graduate student in music must be submitted directly to the Director of Graduate Studies in Music. Normally, the admission process also includes an on-campus interview with the Music Education faculty, which may include an audition demonstrating proficiency in the applicant's major performance area. Applicants who do not meet all of the criteria for regular admission to the Ph.D. degree program may be granted a provisional admission subject to the satisfactory completion of certain specified courses or the attainment of a specified grade-point average within a semester's work.

Course Work The exact amount and nature of course work undertaken will be determined by the advisor with the approval of the student's doctoral committee in light of previous preparation and field of specialization. The student is expected to take Music 494 *Graduate Seminar* as required by the field of specialization. Whatever preparatory courses (languages, statistics, bibliography, etc.) are needed must necessarily be taken early in the course of study. A paradigm of recommended courses and other requirements is available upon request.

Candidacy Upon completion of the requirements of the Division of Music and the general WVU graduate studies requirements, the student will be recommended for admission to candidacy for the degree. These requirements are (in order of occurrence):

1. Demonstrate a satisfactory reading knowledge of German or French or satisfactorily complete Statistics 311-312. Upon recommendation of the advisor, a different romance language may be substituted for French.
2. Pass written qualifying examinations satisfactorily to show:
 - a. Broad knowledge in theory and in music history and literature.
 - b. Appropriate knowledge in the minor field.
 - c. Knowledge in depth in the field of specialization.
3. Pass satisfactorily a comprehensive oral qualifying examination.
4. Present and have accepted an outline and prospectus of the dissertation.

The requirement for doctoral seminars must be completed before the presentation of the prospectus. Graduate students who have met these requirements and who have maintained a minimum average of B (3.0) in courses completed shall be admitted to candidacy. The qualifying examinations shall be considered as one integral examination consisting of the written and oral parts. If the first attempt is unsuccessful, the student is allowed to try the entire examination a second time. The second attempt will be considered final. The applicant's committee may elect to discourage a second attempt if the first does not indicate probable success upon repetition.

Residence Requirements Completion of the requirements for this degree normally requires at least three years of full-time graduate work. A minimum of two consecutive semesters must be spent in residence in full-time graduate study at WVU beyond the master's degree or its equivalent.

Dissertation The candidate must submit a dissertation produced at WVU under the direction of a major professor which demonstrates a high order of independent scholarship, originality, and competence in research, and which makes an original contribution to the field of specialization.

After the dissertation has been approved and all other requirements have been fulfilled, the candidate's doctoral committee will administer the final oral examination. However, a final examination will not be given in the same semester as the qualifying examination. At the option of the student's committee, a final written examination may also be required. The final examination(s) shall be concerned with the dissertation, its contribution to knowledge, its relation to other fields, and the candidate's grasp of the field of specialization.

Time Limitation Following admission to candidacy, doctoral students are allowed five years to complete all remaining degree requirements. An extension of time may be permitted only upon repetition of the qualifying examination and completion of any other requirements specified by the student's doctoral committee.

Doctor of Musical Arts

The degree of doctor of musical arts may be taken in performance and literature (with specialization in piano, organ, voice, percussion, flute, oboe, clarinet, bassoon, horn, trumpet, trombone, tuba, violin, viola, cello, or double bass) or in composition. The primary objective is professional competence at the highest level. Historical and theoretical knowledge sufficient to support individualized interpretations for performers and original creative work for composers is also expected. Writing and speaking skills needed to communicate clearly and effectively are required. To assist the student in achieving these objectives, the course of study includes requirements in performance or composition, academic course work, and research.

Admission Acceptance into doctoral programs is competitive. Applicants to the program leading to the D.M.A. must present necessary credentials for evaluation of previous training and experience. These include transcripts showing an average of at least a 3.0 grade-point average in a minimum of 28 hours in liberal arts studies, submitted through the WVU Office of Admissions and Records. Copies of programs of recent major recitals, and three letters of recommendation from individuals qualified to judge the applicant's potential success as a graduate student in music must be submitted directly to the Director of Graduate Studies in Music. Normally, the admission process also includes an on-campus audition and interview with the faculty of the major performance area. Applicants to the D.M.A. in Composition must also submit scores and recordings for review. Applicants who do not meet all of the criteria for regular admission to the D.M.A. degree program may be granted a provisional admission subject to the satisfactory completion of certain specified courses or the attainment of a specified grade-point average within a semester's work.

Curriculum The exact amount and nature of course work undertaken will be determined by the student's advisor with the approval of the doctoral committee in light of previous preparation and field of specialization. A paradigm detailing recommended courses and other requirements is available upon request.

Candidacy Upon completion of the requirements of the Division of Music and the general WVU graduate studies requirements, the student will be recommended for admission to candidacy for the degree. These requirements are (in order of occurrence):

1. Demonstrate reading proficiency in a foreign language by successful completion either of an examination administered by the Division of Music or the equivalent of the fourth semester of recent language study with a minimum grade of B. The language must be of recognized world significance and appropriate to the student's field of concentration.
2. Pass written qualifying examinations satisfactorily to show:
 - a. Broad knowledge in theory and music history and literature.
 - b. Knowledge in depth of the literature of the field of specialization or of the craft of composition.
3. Pass satisfactorily a comprehensive oral qualifying examination.

Graduate students who have met these requirements and who have maintained a minimum average of B (3.0) in courses completed shall be admitted to candidacy. The qualifying examinations shall be considered one integral examination consisting of written and oral parts. If the first attempt is unsuccessful, the student is allowed to try the entire examination a second time. The second attempt will be considered final. The applicant's committee may elect to discourage a second attempt if the first does not indicate probable success upon repetition.

Residence Requirements Completion of the requirements for this degree normally requires at least three years of full-time graduate work. A minimum of two consecutive semesters must be spent in residence in full-time graduate study at WVU beyond the master's degree or its equivalent.

Performance Requirements Performance requirements (for performance majors) include private lessons, master classes in applied repertory, and public performance of at least two solo recitals and other types of presentations appropriate for the preparation of an artist-teacher, such as chamber music programs, concerto performances, major roles in opera or oratorio, or major accompaniments. Credit for each public performance is established in advance by the student's committee. Performances will be prepared under the direction of a WVU regular graduate faculty member.

Composition Requirements Composition requirements (for composition majors) include private lessons and the creation of a composition portfolio. Credit for each composition is established by the student's committee prior to its completion; it will be subsequently evaluated on a pass-fail basis. Ten credits of the composition portfolio must be completed before admission to candidacy. Work on the major project may commence only after admission to candidacy.

Academic course requirements include courses in music history and theory, and, for performers, an appropriate course in the literature of the major performance area.

Research Requirements Research requirements are intended to develop theoretical and historical investigative techniques sufficient to enable the performer to form valid individualized interpretations and to assist the composer in developing an original style. These requirements consist of the course *Introduction to Music Bibliography* (MUSC 430), demonstration of reading proficiency in a foreign language of major importance, for composers a doctoral seminar, and for all students a research project culminating in an extended written study related to the student's area, although not necessarily constituting original research. This project will be supervised by a regular graduate faculty member who is a member of the student's doctoral committee in consultation with the entire doctoral committee.

Final Examination For performers, the final examination will consist of a major solo recital (which will be regarded as the equivalent of the Ph.D. dissertation defense). Immediately following the public performance the candidate's committee will meet to evaluate the performance as evidence of mature musicianship and finished technique. The final recital will not occur in the same semester as the qualifying examination.

For composers, when all compositions and the major project have been approved and all other requirements have been fulfilled, the candidate's doctoral committee will administer the final oral examination. At the option of the committee, a written examination may also be required. The final examination(s) shall be concerned with the compositions, the major project, and the candidate's grasp of the field of specialization and its relation to other fields. The final examination will not be given in the same semester as the qualifying examination.

Time Limitation Following admission to candidacy, doctoral students are allowed five years to complete all remaining degree requirements. An extension of time may be permitted only upon repetition of the qualifying examination and completion of any other requirements specified by the student's doctoral committee.

Music (MUSC)

200. *Directed Music Studies*. I, II, S. 1-4 HR. (May be repeated for credit.) PR: Consent. Studies in performance, music education, music theory, music history, composition; includes directed or independent study in special topics.

210. *Piano Class Methods and Materials*. I. 3 HR. Methods, materials, and pedagogical techniques, including presentation of keyboard theory as used in functional piano. Practical organization of piano classes. Laboratory: Observation of experienced class teacher and student teaching.
212. *History of Keyboard Pedagogy and Technique*. II. 3 HR. Study of keyboard development and technique, including pedagogical works of the eighteenth through twentieth centuries and application to specific teaching problems. Laboratory: Student teaching and observation, emphasizing analysis and solution of technical problems.
213. *Introduction to Jazz Improvisation*. I. 2 HR. PR: MUSC 63, 64 and Proficiency Level 4. Development of improvisatory skills in the jazz idiom using melodic, harmonic, and rhythmic motives and patterns, and the application of knowledge of tonal centers, chord progressions, and junctions.
214. *Advanced Jazz Improvisation*. II. 2 HR. PR: MUSC 213 or consent. Continuation of MUSC 213. Analysis of chord progressions with emphasis on chord substitutions, turnbacks, and scales. Development of jazz repertoire through performance.
216. *Methods and Pedagogy*. I. 0-2 HR. PR: MUSC 110; Junior standing, or Consent.
217. *Methods and Pedagogy*. II. 1-2 HR. PR: MUSC 216.
218. *Repertoire*. I. 0-2 HR.
219. *Repertoire*. II. 0-2 HR.
221. *Music Before 1500*. I, II, or S. 3 HR. PR: MUSC 33-34 or consent. A study of sacred and secular monophony, Notre Dame organa, thirteenth-century motet and conductus, and fourteenth and fifteenth-century polyphony in France and Italy.
222. *Music of the Sixteenth and Seventeenth Centuries*. I, II, or S. 3 HR. PR: MUSC 33-34 or consent. A study of styles and forms from the High Renaissance to the late Baroque.
223. *Music of the Eighteenth Century*. I, II, or S. 3 HR. PR: MUSC 33-34 or consent. A study of styles and forms of the late Baroque through the Classic period.
224. *Music of the Nineteenth Century*. I, II, or S. 3 HR. PR: MUSC 33-34 or consent. A study of styles, forms, and theoretical concepts illustrative of nineteenth-century music.
225. *Music of the Twentieth Century*. I, II, or S. 3 HR. PR: MUSC 33-34 or consent. A study of stylistic trends during the twentieth century.
226. *History of Jazz*. 3 HR. PR: MUSC 33-34. History and repertory of jazz from its Afro-American origins to 1975 with attention to its major exponents (including Joplin, Armstrong, B. Smith, Morton, Ellington, Gillespie, Parker, Davis, and Coltrane) and its evolving style.
227. *Women in Music*. I. (Alternate Years.) 3 HR. PR: MUSC 33 and 34; or consent. Critical examination of female musicians and their range of musical styles including composers, repertoire, performers, etc., from Medieval period through today; feminist methodology includes re-examination of history and gender theory. (Travel expense possible; see current syllabus.)
230. *Music of Africa*. 3 HR. Traditional music of selected areas of Africa south of the Sahara with particular reference to East Africa. The diverse musical cultures with emphasis on historical background, instruments, ensembles, forms, styles, and music in its social context.
243. *Music Workshops*. I, II, S. 1-2 HR. (May be repeated for credit.)
245. *Marching Band Techniques*. 2 HR.
248. *Music Arranging for Public School Groups*. I, II. 2 HR. PR: MUSC 66. Practical experience in techniques of making simple, workable arrangements of music for public school choral and instrumental performance groups.
260. *Upper-Division Composition*. I, II. 2 HR. (May be repeated for credit.) PR: Two semesters MUSC 160, or consent based on scores submitted. Creative writing with emphasis on practical composition for performance.

263. *Counterpoint. I.* 2 HR. PR: MUSC 68 or consent. Sixteenth century counterpoint.
264. *Counterpoint. II.* 2 HR. PR: MUSC 68 or consent. Eighteenth century counterpoint.
265. *Analysis of 18th-19th Century Music. II.* (Alt yrs) 3 HR. PR: MUSC 68 or by permission of instructor. Detailed study of the materials and structure of European music of the eighteenth and nineteenth centuries.
267. *Electronic Music I.* 2 HR. PR: MUSC 68 or consent. Technology of producing electronic music. Methods of producing electronic compositions, relationship between sound signal and sound perceived, ear training, analysis of examples from electronic music literature, and composition of electronic music.
268. *Electronic Music. II.* 2 HR. PR: MUSC 267. Continuation of MUSC 267.
269. *Analysis of 20th-Century Art Music. II.* (Alt. yrs.) 3 HR. Detailed study of the materials and structure of Western art music of the twentieth century.
273. *Arranging for Small Jazz Ensemble.* 2 HR. PR: MUSC 171, and MUSC 173. Emphasis on small ensembles comprising three to nine players.
274. *Arranging for Large Jazz Ensemble.* 2 HR. PR: MUSC 273 or consent. Continuation of MUSC 273, with emphasis on arranging for big band and studio jazz ensemble.
275. *Jazz Harmony. II.* 2 HR. PR: MUSC 68 and MUSC 213 and MUSC 214 or consent. Advanced jazz theory and harmony. Ear training, keyboard skills, chord voicing, and substitutions.
310. *Secondary Performance. I, II, S.* 1 HR. (May be repeated for credit.) Group or individual instruction in performance on a minor instrument (or voice), with emphasis on methods and materials for school music teachers.
312. *Keyboard Performance and Pedagogy. I, II.* 1-3 HR. (May be repeated for credit.) (Offered in one-credit modules of which students may take one or more each semester.) Pedagogy, repertoire, interpretation, and other topics which will enhance preparation of private piano teachers.
333. *Survey of Orchestral Music.* 3 HR. PR: 6 hr upper-division music history or consent. Survey analysis of orchestral music from the late Baroque period to the present from the perspective of the conductor.
334. *Survey of Wind Music.* 3 HR. PR: 6 HR. of upper-division music history or consent. Survey and analysis of wind music from the late Baroque period to the present from the perspective of the conductor.
335. *Survey of Vocal Music. I.* 3 HR. PR: 6 HR. upper-division music history. Survey of masses, oratorios, cantatas, and opera from late Renaissance to the twentieth century. Solo repertoire will not be included.
341. *Music In The Elem School.* 3 HR.
343. *Contemporary Techniques in Classroom Music.* 3 HR. PR: MUSC 152 or consent. Principles and practice of contemporary techniques in elementary and junior high school classroom music, including those of Orff and Kodaly.
346. *Music making in Middle school/Junior High. II.* 3 HR. PR: MUSC 151, 152, equivalent or consent. Identification and sequencing of appropriate concepts and skills for general music class students. Selection and use of materials including popular music. Emphasis on student music-making activities. Evaluation procedures included.
347. *Music in Early Childhood. S.* 3 HR. PR: MUSC 151, 152, or equivalent; or consent. Musical experiences for children three through ten years. Emphasis on intellectual, physical and social/emotional needs, and characteristics of children. Materials and activities for developing music concepts, skills, and positive response.
357. *Instrumental Methods and materials.* 3 HR. PR: MUSC 51, 44, and 45. Methods, materials, and administration of K-12 instrumental music programs; sequential instruction; conceptual and skill development; aural and reading competencies in music. Bi-weekly lab. 3 HR. lec.

358. *Choral Music Methods and Materials*. 3 HR. PR: MUSC 49 and 51. Methods, materials, and administration of choral music programs; sequential instruction; conceptual and skill development; teaching aural and reading competencies. Bi-weekly lab. (3 HR. lec.)

359. *General Music Methods and Materials*. 3 HR. PR: MUSC 51. Introduction to major pedagogical approaches used in K-12 general music classrooms; examination and development of materials and curricula; analysis of teaching and learning styles. Bi-weekly lab. 3 HR. lec.

360. *Chamber Music: Brass*. I, II. 0-3 HR. (May be repeated for credit.) Performance in small brass ensembles.

361. *Chamber Music: Guitar*. I, II. 0-3 HR. (May be repeated for credit.) Performance in small guitar ensembles.

362. *Chamber Music: Jazz*. I, II. 0-3 HR. (May be repeated for credit.) Performance in jazz ensembles, instrumental or vocal.

363. *Chamber Music: Percussion*. I, II. 0-3 HR. (May be repeated for credit.) Performance in percussion ensembles.

364. *Chamber Music: Percussion-Ethnic*. I, II. 0-3 HR. (May be repeated for credit.) Performance in percussion ensembles emphasizing music from non-Western cultures.

365. *Chamber Music: Percussion-Gamelan*. I, II. 0-3 HR. (May be repeated for credit.) Performance in Gamelan ensembles.

366. *Chamber Music: Percussion-Steel Band*. I, II. 0-3 Hr (May be repeated for credit.) Performance in steel band ensembles.

367. *Chamber Music: Piano*. I, II. 0-3 HR. (May be repeated for credit.) Performance in piano 4-hand chamber music or performance by pianists in other ensembles.

368. *Chamber Music: String*. I, II. 0-3 HR. (May be repeated for credit.) Performance in small string ensembles.

369. *Chamber Music: Voice*. I, II. 0-3 HR. (May be repeated for credit.) Performance in small vocal ensembles.

370. *Chamber Music: Woodwind*. I, II. 0-3 HR. (May be repeated for credit.) Performance in wind quintet and small woodwind ensembles.

371. *Chamber Music: Other*. I, II. 0-3 HR. (May be repeated for credit.) Performance in small mixed ensembles.

392. *Guided Studies in Music*. I, II, S. 1-3 HR. PR: Graduate standing and consent. Intensive individualized reading reported in group discussions. Course may be repeated as many times as necessary, in as many areas as needed; different sections (i.e. areas) may be pursued simultaneously.

398. *Master's Recital*. I, II, S. 2-4 HR. PR: MUSC 299 (Senior Recital) or consent. May be repeated for credit. Master's performance students shall be permitted to give a recital only after they pass a qualifying audition before a designated faculty committee at least six weeks before the recital is to be given.

400. *Performance*. I, II. 1-4 HR. (Open to qualified students in any field in Performance. May be repeated.) Normally offered for two credits (one 30-minute lesson per week) or four credits (one 60-minute) lesson per week. A student must demonstrate ability of grade-level 4 on an instrument to receive credit in MUSC 400 on that instrument.

409. *Master Class in Applied Repertoire*. I, II. 2 HR. (May be repeated for credit.) PR: Consent. Designed to give coverage through performance of the literature of a specific D.M.A. Performance field.

410. *Conducting*. S. 3 HR. PR: MUSC 53 or equivalent. Instrumental and choral conducting. Major works are prepared and conducted through the use of recordings and music organizations.

411. *Conducting Seminar*. 3 HR. PR: MUSC 410. Instrumental and choral conducting of major works under the supervision of the conductor of a major ensemble.

419. *Opera Theatre*. I, II. 0-4 HR. PR: MUSC 19 or consent. Continuation of Music 19. Performance of major roles and advanced production techniques. Qualified students will undertake production-direction projects under supervision.
423. *Keyboard Literature*. S. 3 HR. PR: MUSC 218, 219. Intensive study of the literature for keyboard instruments and the history of the literature.
424. *Song Literature*. S. 1-3 HR. PR: MUSC 218, 219. Intensive study of the Art Song and the Lied and the history of their development.
425. *Choral Literature*. 3 HR.
428. *Aesthetics Of Music*. 2 HR.
429. *Survey of Sacred Music*. S. 4 HR. PR: MUSC 33, 34 or equivalent. Study of music suitable to the liturgical year, including the historical background of the Jewish, Catholic, and Protestant liturgies.
430. *Introduction to Music Bibliography*. I. 3 HR. Survey of music bibliography and research techniques.
431. *Research Problems for Performers*. II. 2 HR. PR: MUSC 430. Discussion of problems of music literature, performance practice, history, and instruments; preparation of a research paper under individual supervision.
432. *Ethnic Percussion*. II. 3 HR. PR: MUSC 119 and MUSC 218 and MUSC 219; graduate percussion majors only. Examination of selected music from regions such as Africa, Asia, and Latin America; focus on music, instruments, and performance techniques and practices; functions of percussion music in society.
433. *Seminar in Ethnic Music*. II. 3 HR. PR: Consent. Open to graduate music majors only. Examination of selected ethnic music from Africa, Asia, and Latin America. Focuses on the music, instruments, and performance techniques and practices of these regions, and how the music functions in society.
440. *Choral Techniques*. II. 2 HR. PR: MUSC 151, 152 or equivalent. Advanced techniques and procedures involved in development of choral ensembles.
442. *Instrumental Techniques*. I. 2 HR. PR: MUSC 151, 152, or equivalent. Advanced techniques and procedures involved in individual performance and instruction through lecture demonstrations by performance faculty.
443. *Historical Foundations of Music Education*. 3 HR. Examination of the history of music education from classical antiquity to the present, with particular emphasis on practices in the United States; examination and application of historical research methods. 3 HR. lec.
444. *Music Education*. II. 3 HR. PR: MUSC 151, 152, or equivalent. Survey and critical study of the total music education program.
446. *Introduction to Research in Music Education*. I. 3 HR. PR: MUSC 151, 152, or equivalent. Methods and measures necessary for conduct and understanding of research in music education.
460. *Composition*. I, II. 3 HR. (May be repeated for credit.) PR: Consent. Primarily for candidates for graduate degrees in theory or composition.
467. *Analytical Techniques*. I, II, S. 3 HR. Analytical techniques and their application to scholarship and performance, with emphasis on pre-twentieth century styles.
468. *Compositional Techniques in Contemporary Music*. I, II, S. 3 HR. Analysis of twentieth-century music.
470. *Transcription and Arranging*. I, II. 2 HR. (May be repeated once for credit.) PR: MUSC 172 or equivalent. Major projects in scoring for orchestra, band, or wind ensemble.
475. *Pedagogy of Theory*. I, II, S. 3 HR. PR: MUSC 68 or consent. Consideration of various approaches to the teaching of theory.

483. *Theory Topics*. I, II, S. 3 HR. (May be repeated for max. 8 HR. credit.) Various types of analytical and theoretical problems and approaches to their solutions.

488. *Doctoral Recital*. I, II, S. 1-4 HR. PR: MUSC 398 (Master's Recital) or consent. Number of credits depends upon length and content of the program; it must be approved in advance by the student's doctoral committee. Acceptance of the recital will be at the discretion of the doctoral committee.

489. *Lecture Recital*. I, II. 2 HR. PR: MUSC 430.

491. *Advanced Study*. I, II. 1-6 HR.

492. *Directed Study*. I, II. 1-6 HR. PR: Consent, which in some cases may be contingent upon doctoral foreign language examination or a course in statistics. Intensive individualized reading reported in group discussions. Course may be repeated as many times as necessary, in as many areas as needed; several different sections (i.e. areas) may be pursued simultaneously.

494. *Special Seminar*. I, II. 1-6 HR. (May be repeated for max. 8 HR. credit.) PR: Consent. Intensive individual investigation and preparation of research papers. Presented by the combined doctoral staff in music.

496. *Graduate Seminar*. I, II. 1 HR. PR: Consent.

497. *Research*. I, II. 1-15 HR. PR: MUSC 430 or consent.

498. *Thesis*. I, II. 2-4 HR. PR: Consent.

499. *Graduate Colloquium*. I, II. 1-6 HR.

Theatre

William J. Winsor, Chairperson

307-A Creative Arts Center

Degree Offered: Master of Fine Arts

The Division of Theatre at WVU offers the master of fine arts as the terminal degree in theatre, with concentrations in acting and theatre design (scene, costume, and lighting).

Admission

Prospective candidates for the degree of master of fine arts in theatre must have a B.A. or B.F.A. degree or equivalent from an accredited institution. Ordinarily, a minimum of 30 semester hours in theatre at the undergraduate level is expected to have been completed with a grade-point average of no less than 2.75, although students with an undergraduate grade-point average of 2.25-2.5 may be admitted with probationary status.

Auditions

Applicants must audition/interview. Applicants intending to specialize in acting must submit a complete resume of their acting experience, at least two letters of recommendation from acting coaches or directors, and must present an audition before at least one member of the acting faculty. Those intending to specialize in design must submit a complete portfolio of their work, a resume of their design experience, and at least two letters of recommendation from design instructors or directors. An interview with at least one member of the design faculty is also required.

For further details regarding these requirements, address inquiries to: Chairperson, Division of Theatre, West Virginia University, P.O. Box 6111, Morgantown, WV 26506-6111.

Advanced Standing

Students may be eligible for 18 hours of graduate transfer credit for advanced standing if they meet the regular requirements of graduate admission. Students admitted with advanced standing are required to be in residence at WVU for a minimum of two semesters and a summer session. The request for advanced standing should be made to the Division Chairperson at the time of application.

Master of Fine Arts Degree Programs

For the master of fine arts degree, students must complete requirements for one of the following two programs:

Acting The acting option is a highly disciplined period of training that focuses on performance. Students will explore basic exercises leading to intensive scene work fully supplemented by technique courses in voice, speech, and movement. The actor takes courses in various areas that are essential to his/her craft (theatre history, text analysis, criticism, etc.) in order to strengthen his/her background. However, the greatest part of time is centered in the studio work every afternoon from 1:00 to 5:00 p.m. Each week, ten hours are spent on acting, four to six hours on voice and speech, and four to six hours on movement.

Successful completion of the minimum number of required graduate hours in one of the two following programs:

- Two academic years and one summer of graduate course and production work totaling 59 credit hours;
- A performance thesis project;
- Oral defense of the thesis project;
- A successful evaluation following the completion of the first year; and
- Overall 3.0 grade-point average.

Design The design option is a three-year course of study for students seeking professional preparation leading to the M.F.A. degree in scenic, costume, or lighting design.

Studio design courses, together with practical laboratory exercises, progressively offer students challenges related to the expectations found in the commercial world.

- Three academic years of graduate course and production work totaling 67 credit hours;
- A production thesis or research design project; and successful oral defense.
- A successful evaluation following the completion of the first and second years; and
- Overall 3.0 grade-point average.

M.F.A. in Acting Suggested Program

Semester I

THET 375 <i>Acting</i>	3 Hr.
THET 351 <i>Voice and Speech</i>	2 Hr.
THET 371 <i>Movement</i>	2 Hr.
THET 491 <i>Makeup</i>	1 Hr.
THET 331 <i>Research</i>	3 Hr.
THET 200 <i>Text Analysis</i>	3 Hr.
	14 Hr.

Semester II	
THET 376 <i>Acting</i>	3 Hr.
THET 352 <i>Voice and Speech</i>	2 Hr.
THET 372 <i>Movement</i>	2 Hr.
THET 200 <i>Text Analysis</i>	3 Hr.
THET 460 <i>Theatre History</i>	3 Hr.
	13 Hr.
Semester III (Summer)	
THET 278 <i>Repertory Theatre</i>	9 Hr.
Semester IV	
THET 353 <i>Voice and Speech</i>	2 Hr.
THET 373 <i>Movement</i>	2 Hr.
THET 377 <i>Acting</i>	3 Hr.
THET 386 <i>Criticism</i>	3 Hr.
THET 400 <i>Performance Thesis</i>	3 Hr.
	13 Hr.
Semester V	
THET 374 <i>Movement</i>	2 Hr.
THET 354 <i>Voice and Speech</i>	2 Hr.
THET 378 <i>Acting</i>	3 Hr.
THET 400 <i>Performance Thesis</i>	3 Hr.
	10 Hr.
TOTAL	59 Hr.

M.F.A. Scene Design Suggested Program

Semester I	
THET 220 <i>Costume History & Design</i>	3 Hr.
THET 367 <i>Scene Design</i>	3 Hr.
THET 361 <i>Sceno-graphics</i>	3 Hr.
THET 331 <i>Research Methods</i>	3 Hr.
	12 Hr.
Semester II	
THET 221 <i>Costume History & Design</i>	3 Hr.
THET 225 <i>Theat. Rigging Electricity</i>	3 Hr.
THET 3647 <i>Scene Design</i>	3 Hr.
THET 379 <i>Rehearsal & Performance</i>	1 Hr.
THET 262 <i>Scene Painting</i>	3 Hr.
	13 Hr.
Semester III	
THET 367 <i>Scene Design</i>	3 Hr.
THET 369 <i>Lighting Design</i>	3 Hr.
THET 386 <i>Dramatic Criticism</i>	3 Hr.
THET 379 <i>Rehearsal & Performance</i>	3 Hr.
	12 Hr.
Semester IV	
THET 367 <i>Scene Design</i>	3 Hr.
THET 369 <i>Lighting Design</i>	3 Hr.
THET 379 <i>Rehearsal & Performance</i>	3 Hr.
THET 395 <i>Period Styles</i>	3 Hr.
	12 Hr.

Semester V

THET 400 <i>Thesis</i>	3 Hr.
THET 379 <i>Rehearsal & Performance</i>	3 Hr.
THET 334 <i>Portfolio Preparation</i>	3 Hr.
	9 Hr.

Semester VI

THET 400 <i>Thesis</i>	3 Hr.
THET 333 Sem. <i>Production Research</i>	3 Hr.
Elective	3 Hr.
	9 Hr.

TOTAL **67 Hr.**

Similar curriculum tracks are offered in costume design and lighting design with course work specific to each discipline.

Theatre (THET)

200. *Directed Theatre Studies*. I, II. 1-12 HR. (May be repeated for max. 12 HR. credit.) PR: Consent. Studies in theatre history, performance, stage design and technology and theatre crafts. Subject matter and number of sections varies from semester to semester.

201. *Advanced Costume Construction*. I, II. 3 HR. PR: THET 105. Study and practical application of costume construction techniques through development of flat-pattern/ drafting skills. Emphasis on use of research to interpret the costume rendering. Extensive hands-on experience with construction projects for Division productions. (May be repeated for a max. 6 HR. credit.)

205. *Stagecraft 2*. II. 3 HR. PR: THET 100 and THET 161. Detailed study of scenery construction and technical theatre. Emphasis on research projects, advanced sceno-graphics and problem-solving techniques. Practical experience through work on productions.

206. *Stage Lighting Theory*. I. 3 HR. PR: THET 107. Theory of stage lighting design through lecture/project work. Emphasis on use of photometric data, production of shop orders, computer-aided paperwork and hand-drafted light plots. Practical work on Division productions.

210. *Theatre Dance 1*. 2 HR.

211. *Theatre Dance 2*. 2 HR.

218. *Period Style for the Theatre*. II. 3 HR. Survey of architecture, painting, sculpture, ornamentation, and furniture from the Egyptian through contemporary periods as utilized in stage design. Lecture with slides and film, and project work.

219. *Stage Properties*. 3 HR. PR: THET 100 and THET 105. Techniques and methods for designing and fabricating stage properties for theatrical production. Practical experience in the construction of properties as class projects and/or for productions.

220. *Costume History 1*. I. 3 HR. Detailed study of the history of clothing from ancient Egypt through the Renaissance as it relates to costume design for the stage. Practical experience in development and presentation of costume designs based on historical clothing.

221. *Costume History 2*. II. 3 HR. Detailed study of the history of clothing from Renaissance to the present as it relates to costume design for the stage. Practical experience in development and presentation of designs based on historical and contemporary clothing.

223. *Costume Crafts*. II. 3 HR. PR: THET 105 and THET 201 Identification and application of the materials and techniques used in the fabrication of costume crafts. Emphasis on research and practical experience through hands-on project work.

225. *Advanced Technical Production*. II. 3 HR. PR: THET 100. Study of advanced technical procedures including rigging, welding, new materials and special effects. Emphasis on the practices and development of skills through projects.

240. *Musical Theatre Repertory*. 2 HR.

242. *Musical Theatre Literature*. 3 HR.

251. *Advanced Vocal Techniques*. I. 2 HR. PR: Consent. Concentration on vocal character demands for the stage. Dialect work. Individual tutorials.

252. *Advanced Vocal Techniques*. II. 2 HR. PR: Consent. Continuation of THET 251.

260. *Theatre Performance and Rehearsal Laboratory*. I, II. 1-3 HR. (May be repeated for max. 9 HR. credit.) PR: Theatre major and consent. Participation in assigned theatre projects. Appreciation of creativity and performance techniques in theatre.

262. *Scene Painting*. II. 3 HR. PR: THET 267, THET 367. An introduction to the basic tools, materials, and techniques of scene painting for the stage.

267. *Scene Design*. I, II. 3 HR. Experience in the design of scenic environments including conceptualization, drafting, rendering, and model building related to the development and presentation of scenic design. (May be repeated for a max. 9 HR. credit.)

268. *Costume Design*. I, II. 3 HR. PR: THET 220 and THET 221. Experience in the design of stage costumes including conceptualization, characterization, and rendering techniques related to the development and presentation of costume design. (May be repeated for a max. 9 HR. credit.)

269. *Lighting Design*. I, II. 3 HR. PR: THET 203. Experience in the design of stage lighting including conceptualization, drafting and rendering techniques related to the development and presentation of lighting design. (May be repeated for a max. 9 credit hours.)

271. *Advanced Stage Movement*. I. 2 HR. PR: THET 172. Advanced study of movement techniques for character work. Period styles of movement.

272. *Advanced Stage Movement*. II. 2 HR. PR: THET 271. Cont. of work in THET 271.

275. *Advanced Acting Studio*. I. 3 HR. PR: Consent. Continuation of advanced exercise work and styles. Coordinated with rehearsal/performance.

276. *Advanced Acting Studio*. II. 3 HR. PR: Consent. Continuation of the work in THET 275. Audition techniques.

278. *Repertory Theatre*. 1-6 HR. (May be repeated for max. 12 HR. credit.) PR: Consent. Rehearsal and performance techniques for producing plays in rotating repertory. Emphasis is on the creation of a synthesized company of performers, designers, and technicians.

280. *Advanced Directing*. II. 3 HR. PR: THET 180 or consent. Emphasis on the work of the director as an integrating artist. High level of proficiency in the direction of a one-act play is required of all students enrolled.

282. *Creative Dramatics*. I, II, S. 3 HR. Study and practice of creative drama for theatre education or classroom/curriculum use. Instructional methods for drama techniques and practical activities are stressed.

284. *Puppetry*. I, II. 3 HR. Comprehensive study of puppetry as a theatrical form. Construction, manipulation, and production methods for adult and youth audiences are highlighted.

290. *Playwriting*. I, II. 3 HR. PR: Consent. Development of basic playwriting techniques. Specific assignments explore characterization, dramatic event, dialogue, tension, compression. Emphasis on the student finding one's own voice, style, and courage to dramatize one's view of the world.

291. *Advanced Playwriting*. II. 3 HR. PR: THET 290. Further exploration of dramatic technique, with emphasis on orchestrating the longer play. Also touches on script analysis of known dramatic texts and on practical problems of a playwriting career.

295. *Classic Theatre to 1650*. I. 3 HR. A survey of theatre history, with emphasis on the development of performance conditions, from classical antiquity through the middle of the seventeenth century.

296. *Euro/American Theatre, 1650-1850*. II. 3 HR. A survey of theatre history, with emphasis on the development of performance conditions, from the middle of the seventeenth century through the rise of realism in the 1840's.

297. *Modern Theatre, 1850-1940*. I. 3 HR. A survey of theatre history, with emphasis on the development of performance conditions, from the middle of the nineteenth century to the outbreak of World War II.

298. *Contemporary Theatre Since 1940*. II. 3 HR. A survey of theatre history, with emphasis on the development of performance conditions, from World War II to the present.

307. *Sound Seminar*. II. 3 HR. An exploration of sound design for the theatre with practical emphasis on producing and recording sound effects.

331. *Research Methods*. I. 3 HR. Methods of production research for graduate students in acting and design, with particular emphasis on writing, library use, and manuscript preparation.

333. *Seminar in Production Research*. II. 3 HR. PR: THET 331 and THET 367. Seminar approach to individual design projects with oral and written presentations of research materials. Intensive critique within class by faculty and peers.

334. *Professional Aspects of Design*. I. 3 HR. PR: THET 367 and THET 368 and THET 369. An in-depth work in the packaging and presentation of the design portfolio, resume writing and job opportunities. Emphasis is placed on methods of making a successful transition from an academic environment into the performance industry.

351. *Graduate Vocal Techniques*. I. 2 HR. PR: Consent. In depth vocal work, with special care taken to address each actor's individual qualities, beginning with breath, alignment, and release of habitual tension. Open resonance and free articulation to support the actor's voice.

352. *Graduate Voice Techniques*. II. 2 HR. PR: Consent. Continue the work introduced in THET 351 with text exploration. Introduce the International Phonetic Alphabet (IPA) and structure.

353. *Advanced Graduate Vocal Techniques*. I. 2 HR. Intensive vocal exploration with Shakespearean text, character choices, and dialect work.

354. *Advanced Graduate Vocal Techniques*. II. 2 HR. PR: Consent. Continuation of THET 353 with emphasis on period style texts and voice-over skills.

361. *Graduate Sceno-Graphic Techniques*. I. 3 HR. Advanced techniques in drafting in accordance with current graphic standards for stage design and technology. Refinement of technique and graphic style through projects and exercise.

362. *C.A.D.D. for the Stage*. 3 HR. PR: THET 361 and THET 367 or consent. Advanced study of the graphic applications of computer assisted design and drafting for stage design through project work and exercises.

367. *Graduate Scene Design*. I, II. 3 HR. (May be repeated for a maximum of 9 HR. credit.) Lecture/Studio; Intensive practical experience in the creation of the scenic environment. Emphasis is placed on the conceptualization, drafting, rendering and model building techniques related to the development and presentation of scenic design.

368. *Graduate Costume Design*. I, II. 3 HR. PR: THET 220 and THET 221. (May be repeated for a maximum of 9 HR. credit.) Lecture/Studio; Intensive practical experience in the design of stage costumes. Emphasis is placed on the conceptualization, characterization and rendering techniques related to the development and presentation of costume design.

369. *Graduate Lighting Design*. I, II. 3 HR. PR: THET 203 or consent. (May be repeated for a max. 9 HR. credit.) Lecture/Studio; Intensive practical experience of lighting design for the theatre. Emphasis is placed on conceptualization, drafting and rendering techniques related to the development presentation of lighting design.

371. *Graduate Stage Movement*. I. 2 HR. PR: Consent. Development of awareness of the actors physical apparatus utilizing movement techniques and mask work to explore basic alignment, neutrality and breath/gesture principles.

372. *Graduate Stage Movement*. II. 2 HR. PR: Consent. Continuation of the work in THET 371 through specific applications in project studies.

373. *Advanced Graduate Stage Movement*. I. 2 HR. PR: Consent. Advanced study of movement techniques for character work, including rhythms of basic language/ movement connections and period styles of movement.

374. *Advanced Graduate Stage Movement*. II. 2 HR. PR: Consent. Continuation of the work in THET 373 through specific applications in project studies.

375. *Graduate Acting Studio*. I. 2 HR. PR: Consent. Foundation of the craft of acting including sensory elements and environment, personalization, communication, and conflict. Scene study with concentration on contemporary American realism and refinement of audition techniques.

376. *Graduate Acting Studio*. II. 2 HR. PR: Consent. Rehearsal and presentation of Realism and extended Realism projects utilizing plays which are ensemble in nature to explore and deepen the acting process.

377. *Advanced Graduate Acting Studio*. I. 2 HR. PR: Consent. Acting Shakespeare—monologue and Scene Study, text, verse scansion and exercise work.

378. *Advanced Graduate Acting Studio*. II. 2 HR. PR: Consent. Rehearsal and presentation of Style project (Shakespeare, Comedy of Manners, Shaw, etc); acting for the camera and the business of acting.

379. *Rehearsal and Performance*. I. 3 HR. (May be repeated for max. 12 HR. credit.) PR: Consent. Participation in assigned performance projects.

386. *Dramatic Theory and Criticism*. I. 3 HR. A survey of the major documents addressing the theories of drama and theatre from the ancient Greeks to the present.

391. *Advanced Topics*. 1-6 HR.

395. *Period Style*. I. 3 HR. (Alternate years). An in-depth exploration of architecture, costumes, customs, and ornamentation in period style for the theatre from Egyptian through Contemporary.

397. *Research*. 1-15 HR.

400. *Performance Thesis*. I, II. 3 HR. PR: Consent. Creative performance project. Requires the projection of a written record which traces the acting or design process as it develops during planning, rehearsal, and performance.

460. *Specialized Seminars*. 3-9 HR. (May be repeated for max. 9 HR. credit.) PR: Consent. Selected fields of study in theatre.

490. *Teaching Practicum*. 1-3 HR.

491. *Advanced Study*. I, II, S. 1-6 HR. PR: Consent. Investigation in advanced subjects which are not covered in regularly scheduled courses. Study may be independent or through specially scheduled lectures.

492. *Directed Study*. 1-6 HR.

493. *Special Topics*. 1-6 HR.

494. *Special Seminars*. 1-6 HR.

495. *Independent Study*. 1-6 HR.

496. *Graduate Seminar*. 1 HR.

497. *Research*. I, II. 1-15 HR.

498. *Thesis*. 2-4 HR.

499. *Graduate Colloquium*. I, II, S. 1-6 HR. PR: Consent. For graduate students not seeking course work credit but who wish to meet residence requirements, use University facilities, and participate in its academic and cultural programs.

School of Dentistry

Robert N. Hornbrook, D.D.S., M.S.D., Interim Dean

William R. McCutcheon, D.D.S., M.P.H., Associate Dean

James E. Overberger, D.D.S., M.S., Associate Dean

David T. Puderbaugh, D.D.S., Assistant Dean

Frank H. Stevens, D.D.S., Assistant Dean

The School of Dentistry was established by an act of the West Virginia Legislature on March 9, 1951, and offers baccalaureate, professional, and advanced degrees. The school is located on the first floor of the Health Sciences Center North. Modern clinical facilities include over 140 treatment areas and new state-of-the-art clinical and preclinical simulation teaching laboratories.

The majority of the faculty are full-time and have had advanced education in all of the recognized specialty areas. All programs are fully accredited by the Commission on Accreditation of the American Dental Association. The School will be expanding its specialty and research areas as additional space and funds become available.

The School of Dentistry offers several advanced education programs beyond the D.D.S. and B.S. degrees.

The Department of Endodontics offers a program of advanced study and clinical training leading to the master of science degree. The program requires a minimum of 24 months (two academic years and two summers) of full-time residency in the School of Dentistry. The program is designed to qualify dentists for careers in endodontic clinical practice, teaching, and research.

The Department of Orthodontics offers a program of advanced study and clinical training leading to the master of science degree. The program requires a minimum of 34 months (three academic years and two summers) of full-time residency in the School of Dentistry. The program is designed to qualify dentists for careers in orthodontic clinical practice, teaching, and research.

The Department of Dental Hygiene offers a program of advanced study and specialized training leading to the master of science degree. The program requires the completion of a minimum of 36 semester hours through full- or part-time enrollment in the School of Dentistry. The program is designed to qualify dental hygienists for careers in teaching, administration, and management.

The School of Dentistry offers one four-year residency in oral and maxillofacial surgery, eight one-year general practice residencies, and two one-year advanced education in general dentistry residencies.

Graduates of both North American and international dental schools are considered for admission to the dental specialty programs. Graduate assistantships are available in the second year of the endodontic program and the third year of the orthodontic program. Stipends are provided for the residency programs.

Information concerning admission requirements and courses of study may be obtained from the Office of the Associate Dean for Academic and Postdoctoral Affairs, WVU School of Dentistry, P.O. Box 9402, Health Sciences Center, Morgantown, WV 26506-9402. Telephone (304) 293-3549, fax (304) 293-2859, e-mail mpowley@wvuvphs1.hsc.wvu.edu.

Graduate Programs

Dental Hygiene M.S.

Dental Specialties M.S.

Professional Degree

Dentistry D.D.S.

(Please see the Robert C. Byrd Health Sciences Center Catalog.)

Graduate Faculty

† Indicates regular membership in graduate faculty.

* Indicates associate membership in graduate faculty.

Professors

†Richard J. Crout, D.M.D., Ph.D. (U. Pitt.). Periodontics. Drug therapy and pharmacology.

†Christina B. DeBiase, Ed.D. (WVU). Dental hygiene, Curriculum and administration, Special patient care.

†Marcia A. Gladwin, Ed.D. (U. Ky.). Dental hygiene, Dental materials, Ethics, Curriculum.

*Robert W. Graves, D.D.S. (WVU). Chairperson. Oral and maxillofacial surgery, Pharmacy, Drug therapy and pharmacology.

David M. Hickman, D.D.S. (WVU). Dental Practice Management, Orofacial pain, Restorative Dentistry.

*Robert H. Hornbrook, D.D.S., M.S.D. (WVU). Periodontics, Treatment therapy.

*Robert M. Howell, D.D.S., M.S.D. (MCV). Chairperson, Oral pathology.

Elizabeth C. Kao, D.M.D. (U. Penn.). Restorative dentistry.

†Gordon G. Keyes, D.D.S., M.S., J.D. (U. MD.). Oral pathology, Legal aspects.

*Barbara K. Komives-Norris, M.S. (Ohio St. U.). Director, Dental hygiene. Educational administration.

†William R. McCutcheon, D.D.S., M.P.H. (WVU). Associate Dean. Dental public health, Behavioral dentistry.

†Peter W. Ngan, D.M.D. (Harvard). Chairperson. Orthodontics, Craniofacial growth and development, Appliance therapy.

†James E. Overberger, D.D.S., M.S. (U. Pitt.). Associate Dean. Materials science, Prosthodontics.

*Robert G. Pifer, D.D.S. (WVU). Chairperson. Oral radiology, Treatment planning.

†Norton P. Smith II, D.D.S. (WVU). Fixed prosthodontics, Computers.

†Carol A. Spear, M.S. (U. Mich.). Dental hygiene related topics, Instrumentation, Infection control, Education.

†Robert N. Stuchell, D.M.D. (U. Pitt.). Preventive dentistry, Treatment therapy.

Associate Professors

†C. Russell Jackson, D.D.S., M.S. (WVU). Endodontics, Pulpal trauma.

†Thomas F. Razmus, D.D.S., M.S. (U. Mich.) Radiology/imaging, Oral medicine, Oral diagnosis/treatment planning.

Assistant Professors

Michael Arcuri, D.D.S. (MCV). Prosthodontics, Maxillofacial prosthodontics.

†Michael D. Bagby, D.D.S., Ph.D. (Loyola). Biomaterials, Restorative dentistry.

†K. Birgitta Brown, D.M.D. (Wash. U.). Operative dentistry, Geriatrics.

Mark C. Durkee, D.D.S. (U. Maryland). Orthodontics, Biomechanics, Biomechanical engineering, Anatomy

*Hera Kim, D.D.S., (N.Y.U.). Orthodontics, Orthodontic bracket strengths, Dental materials.

Kavita Kohli, D.D.S. (U. Nebraska). Pediatric dentistry, Flourides.

†Mark W. Richards, D.D.S., M.Ed. (U. Wash.). Chairperson. Prosthodontics, Implantology.

†Louise Tupta-Veselicky, D.D.S., M.Ed. (WVU). Periodontics, Treatment therapy.

Jack S. Yorty, D.D.S. (WVU). General dentistry.

Dental Hygiene

Barbara K. Komives-Norris, Director, Division of Dental Hygiene

Christina B. DeBiase, Coordinator of the Graduate Program

1073 Health Sciences North

Degree Offered: Master of Science

The School of Dentistry and its Division of Dental Hygiene offer a program of advanced study leading to the degree of Master of Science. This program requires a minimum of 36 semester hours through full-time or part-time enrollment in the School of Dentistry. It is designed to qualify dental hygienists for careers in teaching, administration, research and management.

Options for concurrent master's degrees in the area of community medicine or public administration are also available.

Application Deadlines

Inquiries concerning this program should be directed to the Office of the Associate Dean for Academic and Postdoctoral Affairs, School of Dentistry. Applications should be filed by July 1 for fall admission and by November 1 for spring enrollment.

Admission Requirements

- A baccalaureate degree in dental hygiene from an accredited dental hygiene program or a baccalaureate degree in another field of study from an approved institution of higher education while holding a certificate or associate's degree in dental hygiene from a program fully accredited by the American Dental Association Commission on Dental Accreditation
- Evidence of scholastic and clinical achievement to indicate the applicant's ability to progress in a program of this nature. Generally, a minimum grade-point average of 2.5 or above is required
- Completion of one of these standardized tests: the Graduate Record Examination (GRE) general aptitude test with a score of 1,000 or above, or the Miller Analogies Test with a score of 50 or above
- Submission of all information requested in the graduate application to the Office of the Associate Dean for Academic and Postdoctoral Affairs.

Degree Requirements

- Completion of a minimum of 36 semester credit hours: 21 required credit hours and 15 credit hours in an elective area(s) of dental hygiene specialization. Four elective areas of specialization are offered. These areas include office management, special patients, education/administration, and basic sciences. The student may choose one or two of these areas of study. Courses within these specializations are taught by a number of schools or colleges within the University. An individualized program will be devised for each student which includes a maximum of six hours in research leading to an acceptable thesis. Oral defense of the thesis is required.

GPA

- Achievement of a 3.0 GPA or an overall academic average of at least a B in all work attempted in the master's program. A grade of C or below in two courses will require a faculty review of the student's progress. A third C will result in suspension from the program.
- Removal of all conditions, deficiencies and incomplete grades. Credit hours for courses with a grade lower than C do not count toward degree requirements.

M.S. Curriculum

ED P 311 <i>Statistics</i>	3 HR.
ED P 330 <i>Test and Measurement</i>	3 HR.
DTHY 380 <i>Critical Issues in Health Care</i>	3 HR.
DTHY 381 <i>Expanded Functions</i>	3 HR.
DENT 391 <i>Computer Applications in Dentistry.</i>	2 HR.
DENT 391 <i>Research Methods.</i>	1 HR.
DTHY 397 <i>Research (Thesis)</i>	6 HR.
Total	21 HR.
Elective Area(s) of Dental Hygiene Specialization	15 HR.
Dental Hygiene 391 and Dentistry 391 courses and Courses taught by the School/College of: Business and Economics Human Resources and Education Medicine Multidisciplinary Studies	
Total	36 HR.

Dental Hygiene (DTHY)

380. *Dental Hygiene Seminar and Practice 1.* I. 3 HR. PR: Graduate standing and consent. Examination of the critical environmental issues affecting the future of health care; particular impact on oral health care trends will form major focus. Dental hygiene clinical practice is also included.
381. *Dental Hygiene Seminar and Practice 2.* II. 3 HR. PR: DTHY 380. Expanded services for the dental hygienist with emphasis on restorative and periodontal functions..
391. *Advanced Topics.* I, II, S. 1-6 HR. PR: Consent. Investigation of topics not covered in regularly scheduled courses.
397. *Research.* I, II, S. 1-15 HR. PR: Consent. Research activities leading to a thesis, problem report, research paper, or equivalent scholarly project.

Dentistry (DENT)

391. *Advanced Topics.* (Fourth year.) I and II. 1-6 HR. PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.
490. *Teaching Practicum.* I, II. 1-3 HR. PR: Consent. Supervised practice in college teaching of dentistry.

Endodontics

C. Russell Jackson, D.D.S., M.S., Director
1067 Health Sciences North
Degree Offered: Master of Science

The School of Dentistry and its Division of Endodontics offer a program of advanced study and clinical training leading to the degree of Master of Science. The program requires a minimum of 24 months (two academic years and two summer sessions) of full-time residency in the School of Dentistry and is designed to qualify dentists for careers in endodontic clinical practice, teaching, and research.

Inquiries concerning this program should be directed to the Office of the Associate Dean for Academic and Postdoctoral Affairs. Applicants will be processed in the School of Dentistry. Applicants approved for admission to the program will be notified soon after December 1.

Admission Requirements

The program's admission requirements are as follows:

- Graduation from an accredited school of dentistry.
- Evidence of scholastic and clinical achievement that would indicate the applicant's ability to progress in a program of this nature.

Each applicant must file with the Department of Endodontics all information requested in the departmental application form by September 15.

Program Requirements

For the Master of Science degree, the following requirements must be met:

- Fulfillment of University requirements for graduate study.
- Twenty-four months (two academic years and two summer sessions) of consecutive residency at the WVU School of Dentistry.
- An approved master's thesis based on original research completed during the period of residency in an area related to endodontics.
- Successful completion of a final oral examination.
- Completion of a minimum of 63 credit hours, including 32 hours of endodontic courses, a minimum of 24 hours of selected basic sciences subjects, and a thesis (seven hours).
- Demonstration of satisfactory clinical competency in the student's field.
- Maintenance of a grade level commensurate with graduate education.

Dentistry (DENT)

391. *Advanced Topics*. (Fourth year.) I and II. 1-6 HR. PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

397. *Master's Degree Research or Thesis*. I, II, S. 1-15 HR. PR: Consent. Research activities leading to a thesis, problem report, research paper, or equivalent scholarly project.

399. *Clinic Completion Practicum*. I, II, S. 1-15 HR. Supervised patient care in selected clinical areas specified for each individual student according to their clinical competency requirements.

400. *Advanced Oral Surgery*. I, II, S. 1-12 HR. PR: Consent. Advanced study of therapeutics, hospital protocol, and surgical aspects of oral surgery involving lectures, seminars, demonstrations, and clinical applications.

490. *Teaching Practicum*. I, II. 1-3 HR. PR: Consent. Supervised practice in college teaching of dentistry.

491. *Advanced Study*. 1-6 HR.

492. *Directed Study*. 1-6 HR.

493. *Special Topics*. 1-6 HR.

494. *Special Seminars*. 1-6 HR.

495. *Independent Study*. 1-6 HR.

496. *Graduate Seminar*. 1 HR.

497. *Research*. I, II, S. 1-15 HR.

498. *Thesis*. 2-4 HR.

499. *Graduate Colloquium*. 1-6 HR.

Endodontics (ENDO)

389. *Endodontic Theory*. I, II, S. 2 HR. PR: Consent. Provides seminar discussions in the topics of: basic endodontic techniques, advanced endodontic techniques, endodontic literature review, case presentation, and advanced endodontic theory.

390. *Clinical Endodontics*. I, II, S. 1-5 HR. (May be repeated for credit.) PR: Graduate of an accredited dental school and admission to the Advanced Education Program in Endodontics or consent. Clinical endodontic practice in the areas of: ordinary endodontic cases, complex endodontic cases, hemisection, root amputation, replantation, transplantation, endodontic implantation, vital pulp therapy, apexification, and bleaching.

391. *Advanced Topics*. (Fourth year.) I and II. 1-6 HR. PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

397. *Master's Degree Research or Thesis*. I, II, S. 1-15 HR. PR: Consent. Research activities leading to a thesis, problem report, research paper, or equivalent scholarly project.

490. *Teaching Practicum*. I, II. 1-3 HR. PR: Consent. Supervised practice in college teaching of dentistry.

Microbiology (MBIM)

317. *Special Problems in Microbiology*. I, II, S. 1-7 HR. per sem. with a total of 24 HR. available. Pathogenic microorganisms, including immunology and antimicrobial agents.

Pathology (PATH)

382. *Oral Histopathology*. I, II. 1-2 HR. PR: PATH 338, 353, consent. Microscopic study of head and neck lesions.

401. *Special Studies in Oral Pathology*. I, II. 1-3 HR. PR: Consent. Advanced seminar or independent study of local and/or systemic disease processes affecting oral and facial structures.

Pharmacology and Toxicology (PCOL)

360. *Pharmacology*. I. 4 HR. PR: Dental student standing or consent. Lecture and demonstrations on pharmacologic actions and therapeutic uses of drugs.

Statistics (STAT)

311. *Statistical Methods 1*. I, II. S. 3 HR. PR: MATH 3. Statistical models, distributions, probability, random variables, tests of hypotheses, confidence intervals, regression, correlation, transformations, F and Chi-square distributions, analysis of variance and multiple comparisons. (Equiv. to ED.P. 311 and PSYC 311.)

Orthodontics

Peter Ngan, D.M.D., Chairperson
1077 Health Sciences North

Degree Offered: Master of Science

The School of Dentistry and its Department of Orthodontics offer a program of advanced study and clinical training leading to the degree of Master of Science. The program requires a minimum of 34 months (three academic years and two summers) of full-time residency in the School of Dentistry and is designed to qualify dentists for careers in orthodontic clinical practice, teaching, and research.

Inquiries concerning this program should be directed to the Office of the Associate Dean for Academic and Postdoctoral Affairs. Applications will be processed in the School of Dentistry. Those applicants approved for admission to the program will be notified soon after December 1.

Admission Requirements

- Graduation from an accredited dental school.
- Evidence of scholastic and clinical achievement that would indicate the applicant's ability to progress in a program of this nature. Generally, a minimum grade-point average of 3.0 is required for admission.
- Each applicant must file with the department all information requested in the department application form by September 15.
- Fulfillment of WVU general requirements for graduate study.
- Thirty-four months (three academic years and two summers) of consecutive residency at the School of Dentistry.
- An approved master's thesis based on original research completed during the period of residency in an area related to orthodontics.
- Satisfactory performance in a final oral examination.
- Completion of a minimum of 74 credit hours, including 46 hours of orthodontic courses, a minimum of 15 hours of selected basic sciences subjects, and a research/thesis (13 hours).
- Satisfactory demonstration of clinical competence in the student's field.
- Maintenance of a grade level commensurate with graduate education.

Anatomy (ANAT)

316. *Craniofacial Growth and Maturation*. II. 3 HR. PR: Consent of instructor. The current concepts of craniofacial growth and maturation are presented and integrated for application to clinical problems.

Orthodontics (ORTH)

391. *Advanced Topics*. (Fourth year.) I and II. 1-6 HR. PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

397. *Master's Degree Research or Thesis*. I, II, S. 1-15 HR. PR: Consent. Research activities leading to a thesis, problem report, research paper, or equivalent scholarly project.

416. *Biomechanics*. I, II, S. 2 HR. PR: Consent. Design and function of the teeth and their surrounding structures, and response of these tissues to orthodontic procedures.

417. *Orthodontic Technique*. I, II, S. 2 HR. PR: Consent. Laboratory course in techniques related to fabrication and manipulation of orthodontic appliances.

418. *Orthodontic Materials*. I, II, S. 1 HR. PR: Consent. Physical properties of materials used in orthodontic appliances.

419. *Orthodontic Diagnosis*. I, II, S. 1-3 HR. PR: Consent. Seminar-type class on technique of patient examination, acquiring diagnostic records, and analyzing and correlating this information to the treatment of clinical problems.

420. *Cephalometrics*. S. 1-3 HR. PR: Consent. Use of radiographic cephalometry in studying growth of the human face, analysis of dentofacial malformations, and evaluation of orthodontic treatment.

421. *Orthodontic Mechanics*. I, II, S. 1-4 HR. PR: DENT 416, 417. Seminar and laboratory course on basic orthodontic mechanical properties.

422. *Advanced Orthodontic Mechanics*. I, II, S. 1 HR. PR: ORTH 421. Continuation of DENT 421 involving more difficult type cases and introducing more sophisticated appliance therapy.

423. *Growth and Development*. II 1-5 HR. PR: Consent. Seminar-type course on normal and abnormal growth of the human head and its application to orthodontics.

425. *Orthodontic Seminar*. I, II, S. 1-8 HR. PR: Consent. Discussions including all branches of dental science, with special emphasis on the orthodontic interest. Assigned topics and articles in the literature discussed.

426. *Orthodontic Clinic*. I, II, S. 1-12 HR. PR: DENT 416, 417. Clinical treatment of selected patients.

490. *Teaching Practicum*. I, II. 1-3 HR. PR: Consent. Supervised practice in college teaching of dentistry.

491. *Advanced Study*. 1-6 HR.

492. *Directed Study*. 1-6 HR.

493. *Special Topics*. 1-6 HR.

494. *Special Seminars*. 1-6 HR.

495. *Independent Study*. 1-6 HR.

496. *Graduate Seminar*. 1 HR.

497. *Research*. I, II, S. 1-15 HR.

498. *Thesis*. 2-4 HR.

499. *Graduate Colloquium*. 1-6 HR.

Pathology (PATH)

397. *Pediatric Oral Pathology*. I. 2 HR. PR: Consent. Lecture and seminar course on inherited diseases and other pathologic situations of oral cavity and face specific for pediatric age group.

Statistics (STAT)

311. *Statistical Methods 1*. I, II. S. 3 HR. PR: MATH 3. Statistical models, distributions, probability, random variables, tests of hypotheses, confidence intervals, regression, correlation, transformations, F and Chi-square distributions, analysis of variance and multiple comparisons. (Equiv. to ED.P. 311 and PSYC 311.)

College of Engineering and Mineral Resources

Allen C. Cogley, Ph.D., Dean. Interim Associate Dean for Research & Graduate Studies

Afzel Noore, Ph.D., Associate Dean for Academic Affairs

Royce J. Watts, M.S., Associate Dean for Administration

e-mail: cemr-info@cemr.wvu.edu

web: www.cemr.wvu.edu/

Graduate Degrees Offered:

Aerospace Engineering	M.S.A.E., Ph.D.
Chemical Engineering	M.S. Ch.E., Ph.D.
Civil Engineering	M.S.C.E., Ph.D.
Computer Engineering	Ph.D.
Computer Science	M.S.C.S., Ph.D.
Electrical Engineering	M.S.E.E., Ph.D.
Engineering	M.S.E.
Engineering of Mines	M.S.E.M., Ph.D.
Industrial Engineering	M.S.I.E., Ph.D.
Mechanical Engineering	M.S.M.E., Ph.D.
Occupational Hygiene and Occupational Safety	M.S.
Petroleum and Natural Gas Engineering	M.S.P.N.G.E., Ph.D.
Safety Management	M.S.
Software Engineering	M.S.S.E.

College of Engineering and Mineral Resources (CEMR) graduate programs are administered through the Departments of Chemical Engineering, Civil and Environmental Engineering, Computer Science and Electrical Engineering, Industrial and Management Systems Engineering, Mechanical and Aerospace Engineering, Mining Engineering, Petroleum and Natural Gas Engineering, and Safety and Environmental Management.

The facilities are housed on the Evansdale Campus in three buildings: the Engineering Sciences Building, the Mineral Resources Building, and the Engineering Research Building. These buildings house state-of-the-art research facilities, well-equipped teaching laboratories, classrooms, and offices for the faculty and administration of the graduate programs and Extension and Outreach.

The College offers a doctor of philosophy in most disciplines. The Ph.D. program prepares graduates for leadership in industrial, governmental, or academic fields. The areas of specialization in engineering are aerospace, chemical, civil, computer, electrical, environmental, industrial, mechanical, mining, and petroleum and natural gas engineering. In addition, the College offers the Ph.D. in Computer Science.

Designated master's degrees are offered in aerospace, chemical, civil, electrical, industrial, mining, mechanical, petroleum and natural gas, software engineering, and computer science. A master of science in engineering (M.S.E.) degree is offered to qualified students as determined at the departmental level. Master of science degrees are offered in occupational hygiene and occupational safety and in safety management.

Currently the College offers a certificate in bioengineering, manufacturing systems engineering, materials engineering, and software engineering.

For specific information about a program, students should contact the graduate program coordinator in the area of interest or the Associate Dean for Research and Graduate Studies at (304) 293-4821.

Special Requirements

A student desiring to take courses for graduate credit in the college must comply with the appropriate University regulations for graduate study. To become enrolled in a CEMR graduate program, a student must apply for admission through the Office of Admissions and Records to the major department of the student's choice. Acceptance by the major department will depend upon review of the student's academic background and available facilities in that department.

An applicant with a baccalaureate degree, or its equivalent, from a program accredited by the Accreditation Board for Engineering and Technology (ABET), Computer Science Accreditation Board (CSAB), or an internationally recognized program in engineering or computer science will be admitted on the same basis as engineering or computer science graduates of WVU. Lacking these qualifications, an applicant must first fulfill any special requirements of the department in which the student is seeking an advanced degree.

No credits which are reported with a grade lower than C are acceptable toward an advanced degree. To qualify for an advanced degree, the graduate student must have a grade-point average of at least 3.0 based on all courses acceptable for graduate credit for which the student has received a grade from WVU. Graduate students in the College must also comply with the regulations of their major department.

Individual departments may establish more stringent requirements than those adopted for CEMR as a whole. These departmental requirements are contained in the individual program sections of the graduate catalog.

Course Load

A full-time graduate student must register for at least nine, but no more than 15, credit hours during each regular semester, or at least six, but no more than 12, credit hours in the two summer sessions combined. Permission to carry a heavier load must be obtained in writing from the dean.

Master's Program

For all master's degree students, an advisory and examining committee consisting of at least three faculty members will be appointed. A plan of study must be jointly prepared and approved by the student and all members of the student's advisory and examining committee, the department chair, and the dean or dean's designate, either at the end of the second semester of the student's attendance or at the completion of the twelfth course credit hour, whichever is later. The plan must contain a minimum of 30 semester credit hours, not more than nine of which can be at the 200 level. If a thesis or a problem report is part of the candidate's program, not more than six semester credit hours of research leading to an acceptable thesis or more than three semester credit hours of work for an acceptable problem report may be applied toward the credit hour requirement.

Application for Transfer of Graduate Credit A student wishing to apply graduate credit earned at another institution to a master's degree at WVU must complete an *Application for Transfer of Graduate Credit to WVU* form and have an official transcript submitted to the WVU Office of Admissions and Records from the external institution. A maximum of 12 semester hours from other institutions may be acceptable for credit at WVU in master's degree programs in CEMR. Departmental programs may choose to accept fewer transfer credit hours.

Time to Completion All requirements for the master's degree must be completed within eight years preceding the student's graduation.

Doctor of Philosophy

The academic units within the College that are approved for participation in the doctor of philosophy degree program are the Departments of Chemical Engineering, Civil and Environmental Engineering, Computer Science and Electrical Engineering, Industrial and Management Systems Engineering, Mechanical and Aerospace Engineering, Mining Engineering, and Petroleum and Natural Gas Engineering.

Admission as a graduate student is required of all applicants for admission to a program of study and research leading to the Ph.D. degree. Applicants for admission must hold or expect to receive a bachelor's degree in engineering or computer science from an accredited or an internationally recognized program in engineering or computer science. Although a bachelor's degree is the minimum requirement, a master's degree in engineering or computer science is recommended for applicants. An applicant who holds a B.S. or M.S. in one of the physical sciences or mathematics may be considered for admission. Admission to graduate study does not necessarily assure entrance into a CEMR doctoral program.

Application for Transfer of Graduate Credit A student wishing to apply credit earned at another institution to a doctoral degree program at WVU must submit the *Application For Transfer of Graduate Credit to WVU* form and have an official transcript from the institution forwarded to the WVU Office of Admissions and Records. The approval of transfer credit is at the discretion of the student's advisory and examining committee.

Advisory Committee The student, research advisor, academic advisor, and department chairperson appoint the student's advisory and examining committee. For the Ph.D. program, each committee must consist of at least five members—at least three, including the chairperson, from the student's major department and one from another discipline related to the student's area of interest.

Plan of Study At the end of the second semester of a student's attendance, at the completion of the twelfth credit hour, or when master's degree requirements are completed, whichever is later, the student, with the advice and consent of the student's academic advisor, graduate coordinator, and members of the student's advisory and examining committee, will submit a plan of study, initiated in the student's department, to the dean or dean's designee. Some departments may require that a preliminary dissertation research proposal be submitted along with the plan of study.

Candidacy Examination After admission to the program and after the residence requirement is met, the applicant will take a candidacy examination in which the student must demonstrate: (a) a grasp of the important phases and problems of the field of study and an appreciation of their relation to other fields of human knowledge and accomplishments and (b) the ability to employ the instruments of research developed in the student's area of interest. When an applicant has passed the comprehensive examination, the student will be formally admitted to candidacy for the doctoral degree. A student will have only one opportunity for reexamination.

Credit Requirements The doctor of philosophy degree is not awarded solely on the basis of the accumulation of course credits and completion of a definite residence requirement. The amount and nature of the course work undertaken by a doctoral student will be established for each individual student with the objective of ensuring a reasonable and coherent progression of academic development beyond the baccalaureate and/or master's degree.

Residency Two semesters of full-time attendance at the Morgantown campus is required, consisting of a minimum of nine credit hours each. A summer schedule, consisting of registration in both sessions and completion of a minimum of nine hours, is considered equivalent to a one-semester residence.

Dissertation The candidate must submit a dissertation on a topic within the area of his/her major interest. The doctoral dissertation must represent the results of independent research, must show a high degree of originality and creativity on the part of the student, and must constitute an original contribution to the field of computer science or engineering science and/or design. The dissertation must have good literary form and style and must present a thorough review and survey of prior study and work in the area of research, with acceptable standards of documentation. It is anticipated that the work leading to the completion of the dissertation will require a minimum of 24 hours of research credits or satisfactory evidence of equivalent time devoted to research and preparation of the dissertation.

Time to Completion Requirements for this degree must be completed within five years after admission to candidacy.

Oral Examination Upon completion and approval of the dissertation and fulfillment of all other requirements, the candidate must pass a final oral examination conducted by his/her advisory and examining committee. The examination will be primarily a defense of the dissertation, although other questions necessary to determine the candidate's knowledge, critical ability, and reasoning power in the general field of study related to the research may be asked in order to establish the qualifications of the candidate for the degree.

Faculty

† Indicates regular membership in the graduate faculty.

* Indicates associate membership in the graduate faculty.

Chemical Engineering Professors

†Richard C. Bailie, Ph.D. (Iowa St. U.). *Emeritus*. Biomass pyrolysis, Fluidization, Thermal process.

†Eung H. Cho, Ph.D. (U. of Utah). Coal processing, Leaching and solvent extraction, Environmental science.

†Eugene V. Cilento, Ph.D. (U. Cincinnati). Chairperson. Physiological transport phenomena, Biomedical engineering, Image analysis, Mathematical modeling.

†Dady B. Dadyburjor, Ph.D. (U. Del.). Catalysis, Reaction engineering, Micellization, Coal liquefaction.

Alfred F. Galli, M.S. (WVU). *Emeritus*. Coal conversion, Process engineering, Biomass production.

†Rakesh K. Gupta, Ph.D. (U. Del.). Polymer processing, Rheology, Non-Newtonian fluid mechanics, Composite materials.

†Hisashi O. Kono, Dr. Engr. (Kyushu U.). Fluidization, Powder technology, Powder material science.

†Edwin L. Kugler, Ph.D. (Johns Hopkins U.). Catalysis, Adsorption, Coal liquefaction.

†Alfred H. Stiller, Ph.D. (U. Cincinnati). Chemistry (physical inorganic chemistry), Solution chemistry, Coal liquefaction, Carbon science.

†Richard Turton, Ph.D., P.E. (Ore. St. U.). Fluidization, Heat transfer, Reaction kinetics, Chemical process design.

†Ray Y.K. Yang, Ph.D. (Princeton U.). Biochemical and chemical reaction engineering, Membrane reactors, Biomass conversion, Nonlinear dynamics.

†John W. Zondlo, Ph.D. (Carnegie Mellon U.). Coal enhancement and utilization, Carbon science, Fluid-phase equilibria.

Associate Professors

†Joseph A. Shaeiwitz, Ph.D. (Carnegie Mellon U.). Mass transfer, Drug dissolution, Interfacial phenomena, Design.

†Charter D. Stinespring, Ph.D. (WVU). Wide band gap semiconductor growth and etching, Surface kinetics.

Assistant Professors

†Aubrey L. Miller, Ph.D. (Ill. Inst. Tech.). Fluidization, Multi-phase flow, Reaction engineering.

†Peter S. Stansberry, Ph.D. (Penn. St. U.). Research. Coal and carbon science, Catalysis, High-temperature reactions, Properties of carbonaceous materials.

Civil and Environmental Engineering

Professors

Samuel G. Bonasso, P.E., M.S.C.E. (WVU). Adjunct. Cable transportation, Street engineering, Communication and creativity in engineering.

James G. Collin, Ph.D., P.E. (U. of Ca., Berkley). Adjunct. Geotechnical engineering, Geosynthetics, Earth retaining structures, Slope stabilization, Waste containment.

†Echol E. Cook, Ph.D., P.E. (Okla. St. U.). George B. Berry Chair Professor, Environmental engineering, Biological treatment, Industrial waste treatment, Hazardous and solid waste management, Physical and chemical treatment process.

†Ronald W. Eck, Ph.D., P.E. (Clemson U.). Transportation engineering, Traffic, Highways.

James L. Green, P.E., M.S.C.E. (WVU). Adjunct. Environmental engineering, Water treatment, Water quality.

William J. Harman, P.E., M.S.C.E. (WVU). Adjunct. Construction methods, Construction specifications.

†W. Joseph Head, Ph.D. (Purdue U.). Waste utilization, Highway and airfield pavements, Concrete.

†Ganga Rao V. S. Hota, Ph.D., P.E. (N.C. St. U.). Director, Constructed Facilities Center.

Mathematical modeling of engineering systems, Bridge engineering, Prefabricated housing.

Charles R. Jenkins, Ph.D. (Okla. St. U.). *Emeritus*.

†Larry D. Luttrell, Ph.D., P.E. (Cornell U.). Analysis and design of structures: steel, composite slabs, metal buildings, Case studies of failures.

Michael McCawley, Ph.D. (NYU). Adjunct. Environmental engineering, Air pollution, Air quality.

†Lyle K. Moulton, Ph.D., P.E. (WVU). *Emeritus*.

†William A. Sack, Ph.D., P.E. (Mich. St. U.). *Emeritus*. Environmental engineering, Biological treatment, Bioremediation of hazardous wastes, Nutrient removal, Industrial waste treatment and reclamation.

†H. Jayalath Siriwardane, Ph.D. (VPI). Geotechnical engineering/geomechanics, Finite element method, Computer applications.

†John P. Zaniwski, Ph.D. (Texas). Asphalt Technology Professor. Director, Harley O. Staggers National Transportation Center. Pavement materials, Design, Construction, Maintenance, Infrastructure management.

Associate Professors

Dennis C. Chambers, P.E., M.S.C.E. (WVU). Adjunct. Geotechnical engineering, Construction and materials.

†H. L. Chen, Ph.D. (Northwestern U.). Structural dynamics, Structural experimentation, Dynamic soil-structure interaction, Damage in reinforced concrete structures.

†Julio F. Davalos, Ph.D. (VPI). Finite element analysis and modelling of structures, Spatial stability investigation, Materials characterization of engineered timber products.

†Darrell R. Dean, Jr., L.L.S., Ph.D. (Purdue U.). Land surveying, Mapping, Photo grammetry.

†Robert N. Eli, Ph.D., P.E. (U. Iowa). Hydrology, Hydraulics, Computer graphics.

†Donald D. Gray, Ph.D., P.E. (Purdue U.). Fluid flow, Computational fluid mechanics.

†Udaya B. Halabe, Ph.D., P.E. (MIT). Nondestructive evaluation and in-situ condition Assessment of structures and materials, Wave propagation, Structural analysis and dynamics.

†David R. Martinelli, Ph.D. (U. Md.). Chair. Transportation engineering, Traffic operations, Systems analysis, Infrastructure management.

David A. Pask, P.E., M.S., Eviron. (Tech. U. of Nova Scotia). Adjunct. Environmental engineering,

Water treatment, Public health, Wastewater treatment.

[†]Brian E. Reed, Ph.D. (SUNY-Buffalo). Environmental engineering, Hazardous waste treatment, Groundwater remediation.

Robert W. Wheeler, M.S.C.E. (WVU). Adjunct. Environmental engineering, Public health, Water supply.

William D. Wyant, M.S.C.E. (WVU). Adjunct. Transportation engineering, Construction methods.

Assistant Professors

Thippeswamy Hemanth, Ph.D. (WVU). Research. Structural analysis, Advanced structural materials.

Jie Huang, Ph.D. (WVU). Research. Fluid mechanics, Elementary particle physics.

Roberto Lopez-Anido, Ph.D. (WVU). Research. Modeling and experimental characterization of composite and hybrid material components and systems for civil structures; Bridge engineering; timber bridges; Numerical methods of structural analysis; Applied mechanics.

Kumanaswamy Sirakumaran, Ph.D. (Colorado). Adjunct. Sediment transport and hydraulic engineering.

[†]Roger Viadero, Ph.D. (WVU). Research. Physical chemical processes, Nuclear waste management, Industrial and hazardous waste treatment.

Computer Engineering

Professors

[†]Powsiri Klinkhachorn, Ph.D. (WVU). Microprocessor applications, Computer architecture, Binary and nonbinary logic.

[†]Roy S. Nutter, Jr., Ph.D., P.E. (WVU). Electric vehicles, Neural networks, Microprocessor systems, Computer architecture, Expert systems.

Robert E. Swartwout, Ph.D. (U. Ill.). *Emeritus*.

[†]Stuart K. Tewksbury, Ph.D. (U. Rochester). VLSI & ULSI digital electronics, Digital communications, Microprocessor systems.

Associate Professors

[†]Hany H. Ammar, Ph.D. (U. Notre Dame). Modeling and evaluation of parallel and distributed systems, Performance and dependability.

[†]Robert L. McConnell, Ph.D. (U. Ky.). Undergraduate coordinator, Electronic instrumentation, Power control, Microcomputer based applications, Engineering design.

[†]Afzel Noore, Ph.D. (WVU). Associate Dean. Fault-tolerant computing, Design for testability, VLSI design and testing, Computer architecture, Distributed and parallel processing.

Assistant Professors

[†]Bojan Cukic, Ph.D. (U. Houston). High-assurance systems, Software engineering, Parallel and distributed computing, Fault-tolerant systems, Medical imaging.

Computer Science

Professors

[†]John M. Atkins Ph.D. (U. Pitt). Design of database management systems, Analysis of algorithms, Mathematics of computation.

[†]D. Michael Henry, Ph.D. (Texas Christian U.). Databases, Cryptography, Neural networks.

^{*}Franz X. Hiergeist, Ph.D. (U. Pitt.). Mathematics of computation.

[†]Ali Mili, Ph.D. (U. Illinois). Software Engineering, Program specification and verification.

Wayne A. Muth, Ph.D. (Iowa St. U.). *Emeritus*.

[†]Y. V. Ramana Reddy, Ph.D. (WVU). Artificial intelligence, Knowledge-based simulation, Computer graphics.

[†]George E. Trapp, Ph.D. (Carnegie Mellon U.). Numerical analysis, Mathematical programming, Network models.

Associate Professors

William H. Dodrill, M.S. (Columbia U.). *Emeritus*.

[†]V. Jagannathan, Ph.D. (Vanderbilt U.). Distributed Intelligent Systems, Internet and security technologies.

[†]Srinivas Kankanahalli, Ph.D. (N. Mex. St. U.). Artificial Intelligence, Connectionism/neural networks, Parallel processing.

- †James D. Mooney, Ph.D. (Ohio St. U.). Co-Interim chairperson. Operating systems, Computer architecture, Software portability.
- †Sumitra Reddy, Ph.D. (WVU). (Research). Healthcare informatics, Componentware, Intelligent systems, Information technology evaluation.
- †Murali Sitaraman, Ph.D. (Ohio St. U.). Software engineering, Data structures, Software reuse.
- †Frances L. Van Scoy, Ph.D. (U. Va.). Programming languages and compilers, Software engineering, Parallel processing.

Assistant Professors

- †John R. Callahan, Ph.D. (U. Md.). Development of programming languages. Tools for distributed systems, Software engineering.
- †William F. Klostermeyer, Ph.D. (U. Fla.). Design and analysis of algorithms, Combinatorics, Graph theory.

Electrical Engineering

Professors

- Walton W. Cannon, Ph.D. (U. Ill.). *Emeritus*.
- †Muhammad A. Choudhry, Ph.D. (Purdue U.). Power system control, DC transmission, Stability, Power electronics.
- †Wils L. Cooley, Ph.D., P.E. (Carnegie-Mellon U.). Graduate Coordinator. Biomedical engineering, Electronics, Design.
- †Ali Feliachi, Ph.D. (Ga. Tech.). Large-scale systems, Adaptive control, Power systems.
- †Ronald L. Klein, Ph.D. (U. Iowa). Automatic control, Estimation theory, System identification, Electric vehicles.
- †Craig S. Sims, Ph.D. (SMU). Signal processing, Control systems, Estimation theory.
- Nelson Smith, Jr., D.Sc. (U. Pitt). *Emeritus*.

Associate Professors

- Everette C. Dubbe, B.S.E.E. (S. Dak. St. U.). *Emeritus*.
- †Parviz Famouri, Ph.D. (U. Ky.). Analysis and control of electrical machines, Motor drives, Power electronics, Electric vehicles.
- †Lawrence Hornak, Ph.D. (Rutgers U.). Co-Interim Chair. Optics, VLSI, Integrated optics, Microstructures.
- †Mark A. Jerabek, Ph.D., P.E. (Purdue U.). Acoustics, Ultrasonic tomography, Electromagnetics.

Assistant Professors

- †Biswajit Das, Ph.D. (Purdue U.). High speed electronic and photonic devices, Nanoscale device fabrication and testing, Electro-optic and nonlinear optical materials and devices, Nano-optics.
- †Stephanie Caswell Schuckers, Ph.D. (U. Michigan). Signal processing, Cardiovascular engineering, Medical devices.

Industrial and Management Systems Engineering

Professors

- †Rashpal S. Ahluwalia, Ph.D., P.E. (Western Ontario U.). Computer integrated manufacturing, Flexible manufacturing, Robotics, Expert systems, Process control and modeling.
- †Jack Byrd, Jr., Ph.D., P.E. (WVU). Operations research, Production systems, Entrepreneurial studies.
- †Robert C. Creese, Ph.D., P.E. (Penn. St. U.). Manufacturing processes/systems, Foundry engineering, Cost engineering.
- †Wafik H. Iskander, Ph.D., P.E. (Tex. Tech U.). Operations research, Simulation, Applied statistics.
- †Majid Jaraiedi, Ph.D. (U. Mich.). Quality control and applied statistics, Information systems.
- †L. Ted Moore, Ph.D. (Rice U.). *Emeritus*.
- †Ralph W. Plummer, Ph.D., P.E. (WVU). Chairperson. Human factors, System safety, Industrial hygiene.
- †Terrence J. Stobbe, Ph.D. (U. Mich.). Ergonomics, System safety, Industrial hygiene.

Associate Professors

- †Warren R. Myers, Ph.D. (WVU). Industrial hygiene, Ergonomics, Safety engineering.

*B. Gopalakrishnan, Ph.D. (VPI). Manufacturing engineering, Artificial intelligence, Concurrent engineering.

Assistant Professors

*Dianne McMullin, Ph.D. (Nebraska). Ergonomics, Safety engineering, Occupational safety.

Mechanical and Aerospace Engineering

Professors

*Richard A. Bajura, Ph.D., P.E. (U. N. Dame). Director of NRCCE. Fluids engineering.

*Reda Bata, Ph.D. (U. of Florida). Alternate fuels, Thermal sciences, Engine testing.

Edward F. Byars, Ph.D., P.E. (U. Ill.). *Emeritus*.

*Ismail Celik, Ph.D. (U. Iowa). Fluids engineering.

Keh-Minn Chang, Ph.D. (U. of Calif. Berkeley). Materials, Physical metallurgy.

*Nigel Clark, Ph.D. (U. Natel. So. Africa). Multiphase flows, I.C. engines.

*Allen C. Cogley, Ph.D. (Stanford U.) Dean. Aerodynamics, Fluid mechanics, Aerospace engineering.

*Russell K. Dean, Ph.D. (WVU). Associate Provost for Curriculum and Instruction. Engineering mechanics.

Hasan T. Gencsoy, M.S.M.E. (WVU). *Emeritus*.

Russell R. Haynes, Ph.D., P.E. (WVU). Adjunct. Engineering design.

*Eric K. Johnson, Ph.D., P.E. (U. Wisc.). Heat transfer, Combustion, Thermodynamics, Gas-solid flows.

*John Kuhlman, Ph.D. (Case West. Res. U.). Fluid mechanics.

*Steve Lewellen, Ph.D. (UCLA). Research. Fluid dynamics.

Thomas R. Long, P.E., Ed.D. (WVU). Engineering design.

*John L. Loth, Ph.D., P.E. (U. Toronto). Aerospace systems, Combustion.

*Donald W. Lyons, Ph.D., P.E. (Ga. Tech.). Chairperson. Manufacturing systems, Instrumentation, Engines and emissions.

*Kenneth H. Means, Ph.D., P.E. (WVU). Kinematics, Dynamics and stability, Friction and wear.

In-Meei Neou, Ph.D. (Stanford U.). *Emeritus*.

Nathan Ness, Ph.D. (Poly. Inst. NY). *Emeritus* and Visiting. Aerodynamics, Thermodynamics.

*G. Michael Palmer, Ph.D. (WVU). Instrumentation, Microprocessor applications.

Augustine A. Pitrolo, B.S.M.E. (WVU). Adjunct. Fossil energy.

Helen L. Plants, P.E., M.S.C.E. (WVU). *Emerita*.

Harold Schall, B.S. (C. W. Post Coll.). Adjunct. Quality function deployment.

Samir Shoukry, Ph.D. (U. Aston in Birmingham). Research. Structural dynamics, Neural nets, Instrumentation.

*Nithiam T. Sivaneri, Ph.D. (Stanford U.). Associate Chairperson. Structural mechanics. Composite materials, Finite-element analysis.

Robert D. Slonneger, P.E., M.S.M.E. (U. Tex.). *Emeritus*.

*James E. Smith, Ph.D. (WVU). Mechanical design.

*John E. Sneckenberger, Ph.D., P.E. (WVU). Mechanical design and automation.

William Squire, M.A. (U. Buffalo). *Emeritus*.

*Charles Stanley, Ph.D. (WVU). Pulmonary bioengineering, Mechanical instrumentation.

Charles E. Wales, Ed.D. (WVU). *Emeritus*. Engineering Education.

*Richard E. Walters, Ph.D. (WVU). *Emeritus*. Aerospace engineering.

Donald T. Worrell, P.E., M.S.E. (WVU). *Emeritus*.

Associate Professors

Rodney Anderson, Ph.D. (U. Mo.-Rolla). Adjunct. Aerosol and particle science.

*Chris Atkinson, Sc.D. (MIT). Fluid Mechanics, Instrumentation, Engine emissions.

*Larry Banta, Ph.D. (Ga. Tech.). Robotics, Automation.

*Ever Barbero, Ph.D. (VPI). Structural Mechanics, Materials, Constructed facilities.

*Mridul Gautam, Ph.D. (WVU). Fluid mechanics.

*Bruce Kang, Ph.D. (U. Wash.). Experimental mechanics, Advanced materials.

*Gary Morris, Ph.D. (WVU). Associate Chairperson and Graduate Program Director. Fluid mechanics, Combustion.

*Victor Mucino, D.E. (U. Wisc.-Mil.). Engineering design.

*Marcello Napolitano, Ph.D. (Okla. St. U.). Aircraft stability and control, Feedback control, Dynamics.

- [†]Timothy Norman, Ph.D. (Purdue). Advanced composite materials, Fracture mechanics, Experimental mechanics, Biomechanics.
 John E. Notestein, M.S.M.E. (Purdue U.). Adjunct. Fossil energy.
[†]Jacky Prucz, Ph.D. (Ga. Tech.). Structural dynamics, Composite materials.
 Jaiyoung Ruy, M.D. (Catholic Med. Coll. Korea). Adjunct. Bioengineering.
 Larry D. Strickland, Ph.D. (WVU). Adjunct. Fossil energy.
[†]Wallace S. Venable, P.E., Ed.D. (WVU). *Emeritus*. Engineering mechanics.

Assistant Professors

- Emad Amin, Ph.D. (U. of Leeds, UK). Research. Computational fluid dynamics, Combustion.
 Robert Bond, Ph.D. (WVU). Research. Aerodynamics, Thermoscience.
 Kristine Craven, Ph.D. (WVU). Visiting.
 Jaiji Du, Ph.D. (U. of Wash.). Fracture and experimental mechanics.
 John R. Ethernan, M.S. (Geo. Wash. U.). Adjunct. Mechanical system safety.
[†]David Lewellen, Ph.D. (Cornell). Research. Fluid Dynamic Turbulence.
 Hwei-Min Lu, Ph.D. (WVU). Research. Thermodynamics, Machine design.
 Jason Smith, Ph.D. (WVU). Research. Computational fluid dynamics.
 Greg Thompson, Ph.D. (WVU). Research. Thermodynamics, Machine design.
[†]Wenguang Wang, Ph.D. (WVU). Research. Mechanical design, Engines and emissions.
 W. Scott Wayne, Ph.D. (WVU). Research. Machine design.

Mining Engineering Professors

- Jay H. Kelley, Ph.D. (Penn. St. U.). Distinguished. *Emeritus*.
[†]A. Wahab Khair, Ph.D. (Penn. St. U.). Rock mechanics, Ground control.
[†]Syd S. Peng, Ph.D. (Stanford U.). Charles T. Hollard Distinguished Professor of Mining Engineering and Chairman. Longwall mining, Ground control.
[†]David C. Yang, Ph.D. (U.C.-Berkeley). Research. Coal/mineral processing.

Associate Professors

- Donald M. Bondurant, M.S.E.M. (WVU). *Emeritus*.
 Joseph D. McClung, M.S.E.M. (U. Pitt.). *Emeritus*.
[†]Felicia F. Peng, Ph.D. (WVU). Coal preparation, Coal utilization, Process control, Plant design.

Assistant Professors

- Yi Luo, Ph.D. (WVU). Research. Surface subsidence.

Particle Analysis Center

- [†]Thomas P. Meloy, Ph.D. (MIT). Benedum Professor. Powder science, Mineral liberation, Plant circuit analysis.

Petroleum and Natural Gas Engineering Professors

- [†]Samuel Ameri, P.E., M.S.Pet.E. (WVU). Chairman. Formation evaluation.
[†]Khashayar Aminian, Ph.D. (U. Mich.). Natural gas engineering, Reservoir simulation.
 Robert W. Chase, Ph.D. (Penn. St. U.). Adjunct. Natural gas engineering.
[†]Thomas P. Meloy, Ph.D. (MIT). Petroleum engineering simulation.
^{*}James A. Wasson, P.E., M.S.P.N.G. (Penn. St. U.). *Emeritus*. Reservoir engineering, Enhanced oil recovery.
 Larry Woodford, A.M. (Ind. U.). Adjunct.

Associate Professors

- [†]H. Ilkin Bilgesu, Ph.D., P.E. (Penn. St. U.). Drilling engineering.
[†]Shahab Mohaghegh, Ph.D. (Penn. St. U.). Reservoir engineering.

Safety and Environmental Management Professors

- [†]Daniel E. Della-Giustina, Ph.D. (Mich. St. U.). Safety management services, Sport safety, Transportation safety.

*Warren Myers, Ph.D. (WVU). Interim Chairperson. Industrial hygiene, Human factors, Safety engineering.

Associate Professors

*Andrew Sorine, Ed.D. (WVU). Safety studies/management education.

*Gary Winn, Ph.D. (Ohio St. U.). Safety studies, Transportation safety.

Assistant Professors

David L. Durham, M.S. (WVU). Research. Environmental management.

*Linda Frederick, Ph.D. (U. of Mich.). Industrial health/Ergonomics.

*Michael J. Klishis, Ph.D. (WVU). Miner training, Curriculum development.

David Whaley, Ph.D. (St. U. of NY at Buffalo). Industrial hygiene/Environmental management.

Extension and Outreach

Extension and Outreach is a new unit within the College of Engineering and Mineral Resources that is composed of two programs: Mining Extension and Industrial Extension.

Industrial Extension was transferred into CEMR on September 1, 1996.

James M. Dean, M.S.E.M. (WVU). Director. Mine management, Mine safety and health, Initial miner training.

Industrial Extension Service

James M. Dean, M.S.E.M. (WVU). Interim Associate Director, Mine management, Mine safety and health, Initial miner training.

Extension Engineers

Thomas A. Bailey, P.E., B.I.E. (Ohio St. U.). Quality assurance, Systems, Environmental planning and waste reduction, New production technologies, Technology transfer.

Thomas R. Bodnar, P.E., B.S.M.E. (U. Pitt). Modern manufacturing methods and technologies, Management philosophies and business management practices, Productivity improvement.

Lawrence D. Dixon, P.E., M.S.C.S.E. (WV Graduate College) B.S.E.M. (WVU) B.S.E.E.

(W.V.U.I.T.). Energy conversion, Energy conversion devices, Efficient energy usage, Digital control systems, Cellular manufacturing.

Raymond D. Neupert, P.E., B.S.I.E. (WVU). Technology development, Quality management systems, Cellular manufacturing, Strategic planning, Cost control.

Kathi A. Shrider, BS-Economics. (U. of Charleston). Information systems, Environmental planning and waste reduction, New production technologies and technology transfer, Product, Development process re-engineering.

Merle Thomas, Jr., B.A., M.A.-Mathematics. (U. of Texas). Computerized production control and scheduling systems. Designing and installing process controllers, Programmable logic controllers, Device drivers.

Mining Extension Service

Professor

Joseph C. Dorton, B.S. (Concord C.). Mine foreman training, Electrical training, Mandatory miner training courses.

Associate Professors

Robt L. Halstead, B.S. (Morris Harvey College). *Emeritus*. Mine foreman training, Electrical training, Production technology.

Thomas L. Savage, B.S. (Cornell U.). *Emeritus*. Hydraulics.

Assistant Professors

*Cynthia M. Bindocci, Ed.D. (WVU). Director-COMER Museum, Small museums, Collection management, Environmental monitoring, Women and coal, History of technology.

Luther B. Ferguson. *Emeritus*.

James H. Kincaid, B.S. (WV Tech). Mine foreman training, Mandatory miner training courses, Mine management, CPR training.

Mining Extension Agents

James M. Dean, M.S.E.M. (WVU). Mine management, Mine safety and health, Initial miner training.

Thomas W. Hall, B.S. (Fairmont St. C.). Mine foreman training, Mandatory miner training, Mining methods.

William E. Moser, B.S. (Robert Morris C.). Director—Emergency Preparedness Center. Mine fires, Mine rescue, Mine health and safety.
Joseph E. Spiker, M.S. (WVU). Interim Associate Director. Coal mining operations, Safety and health management, Education administration.
Ireland Sutton, B.S. (WVU Inst. of Tech.). Surface mine blasting, Underground and surface power systems, Mandatory miner training.

Mine Emergency Preparedness Center

William E. Moser, B.S. (Robert Morris Coll.). Director. Mine rescue/safety.
Joseph E. Spiker, M.S. (WVU). Mine rescue/safety.

COMER Museum

Cynthia M. Bindocci, Ed.D. (WVU). Director.

Chemical Engineering

Eugene V. Cilento, Ph.D., Chairperson

403 Engineering Sciences Building

e-mail: che-info@cemr.wvu.edu

web: <http://www.cemr.wvu.edu/~wwwche/>

Degrees Offered:

Master of Science in Chemical Engineering

Master of Science in Engineering with a major in Chemical Engineering

Doctor of Philosophy with a major in Chemical Engineering

The Department of Chemical Engineering, with 13 faculty members, 120 undergraduates, and over 30 graduate students, has one of the oldest doctoral-granting programs in the University. From the initial doctoral degree in 1932, the graduate course program has been based on advanced chemical engineering fundamentals, while the research program has reflected a balance of fundamental research areas and their application to relevant technological areas such as bioengineering, catalysis, coal conversion, materials, and polymer processing.

Faculty Research Areas

Chemical engineering faculty are presently involved in the following research areas: biochemical engineering, biomedical engineering, carbon science, catalysis, fluid mechanics, heat transfer, materials engineering, polymers and polymer rheology, reaction engineering, separation processes, solution chemistry, surface science, and thermodynamics. These fundamental areas are finding applications in biochemical technology, biotransport, coal gasification and liquefaction, materials handling and processing, *in-situ* combustion, non-fuel uses of coal, carbon products, and synthetic fuels.

Faculty members possess a wide variety of industrial experience and are routinely in contact with their counterparts in industry. This contact with real engineering problems enables them to convey a practical experience to students while keeping in perspective many of the fundamental concepts involved in graduate study. During the last five years, the chemical engineering faculty have authored or coauthored 1 book, published over 230 journal articles, have been issued 6 patents, made over 275 presentations at professional meetings, and supervised the completion of 37 master's and 15 doctoral degrees and over 40 post-doctoral students and visiting scholars. In addition, faculty members have taught short courses throughout the United States and abroad.

Degree Programs

The department is authorized to admit students to the following degree programs: master of science in chemical engineering (M.S. Ch.E.), master of science in engineering (M.S.E.), and College of Engineering and Mineral Resources interdisciplinary doctor of philosophy (Ph.D.). Students in these programs must comply with the rules and regulations as presented in the general requirements for graduate work in the College of Engineering and Mineral Resources and in the Department of Chemical Engineering. Students interested in pursuing work for a master's or doctoral degree in chemical engineering should contact the department for copies of the required guidelines and application information.

Admission

Admission to the M.S.Ch.E. program is restricted to those holding a baccalaureate degree in chemical engineering or its equivalent. The M.S.E. program is available to students holding baccalaureate degrees in other fields of engineering and the physical sciences who wish to pursue a broad interdisciplinary program relevant to the major graduate areas administered by the department. To be admitted as a regular graduate student, an applicant must have a B.S. degree and a sound record in previous college work with a minimum 3.0/4.0 cumulative grade-point average. Applicants who cannot meet these conditions may be considered for admission in a conditional category. Students admitted with deficiencies in their undergraduate programs are required to take some chemical engineering courses as prerequisites for graduate courses. These requirements are stated as a condition for admission.

Planned Programs

M.S.Ch.E. candidates should expect to obtain their degree in about 18 months. M.S.E. students typically require 1 to 1 1/2 years beyond completion of prerequisite courses. Typically, the prerequisite courses include as a minimum: Ch E 110, 111, 112, 142, 145, and 172. All M.S. degree candidates are required to perform research and will follow a planned program which conforms to either of the following outlines:

- A minimum of 30 semester credit hours, excluding seminar, not more than six of which are in research leading to an acceptable thesis.
- A minimum of 33 semester credit hours, excluding seminar, not more than three of which are in research leading to an acceptable problem report.

The course work M.S. degree option is not offered by the Department of Chemical Engineering.

Required Courses

All students are required to take Ch E 301, 344, and 345, and all full-time students are required to take one credit of journal club/seminar (Ch E 400) for each semester enrolled. The research advisor, in conjunction with an advisory and examining committee (AEC) to be designated by each student, will be responsible for following departmental guidelines to determine the plan of study appropriate to the student's program.

A written research proposal and oral presentation of this proposal is required of all M.S. students. This oral defense is administered by the student's AEC and must be completed by the end of the second semester of the first year for M.S.Ch.E. candidates, and as soon as possible but not later than the end of the second semester of the second year for M.S.E. candidates.

Final Examination

All students are required to pass a final oral examination, administered by their AEC, covering both the thesis or problem report (depending on the program selected) and related course material.

Doctor of Philosophy

A candidate for the degree of doctor of philosophy must comply with the rules and regulations as outlined in the general requirements for graduate work in engineering and the specific requirements stated in the departmental guidelines. Students who are interested in pursuing a Ph.D. degree in the Department of Chemical Engineering should contact the department for specific information. A program with a major in chemical engineering, designed to meet the needs and objectives of each student, will be developed in consultation with the student's research advisor and advisory and examining committee (AEC). It should be emphasized that the Ph.D. degree is primarily a research degree, and therefore the research work for a doctoral dissertation should show a high order of originality on the part of the student and must offer an original contribution to the field of engineering science.

Admission Admission to the Ph.D. program is open to students who qualify as regular graduate students and who have obtained a B.S. or M.S. degree in science or engineering. Students admitted must have demonstrated an excellent academic record in previously completed college course work with a minimum cumulative grade-point average of 3.0/4.0. Three letters of recommendation are required, and GRE scores are required by the department. Students in the Ph.D. program should complete the requirements in two to four years.

Required Courses All B.S. students entering the Ph.D. program are required to take Ch E 301, 344, and 345, while M.S. students entering the program must demonstrate equivalent courses taken for graduate credit. In addition, all full-time students must take one credit of seminar/journal club (Ch E 400) each semester. For a student admitted directly after the B.S. degree, the Ph.D. program consists of a minimum of 36 course credit hours, excluding research (Ch E 497) and seminar/journal club (Ch E 400). If the student has an M.S. in chemical engineering from WVU, the program consists of a minimum of 12 course credit hours (excluding Ch E 497 and Ch E 400). If the student has an M.S. in chemical engineering from another institution, the program consists of a minimum of 18 course credit hours (excluding Ch E 497 and Ch E 400). Students must complete a minor, consisting of a minimum of nine semester hours of a coherent set of courses taken outside the department. These courses may be related to the major research area. Nontechnical courses are considered only under exceptional circumstances. Courses at the 200 level may be acceptable. All courses must be approved by the AEC and the academic advisor. Students must complete graduate courses with an overall course work average of 3.0 or better (exclusive of research credits) and complete all Ch E courses with an overall grade-point average of 3.0 (exclusive of research credits). A minimum of 24 credit hours in dissertation research is required. Also, two semesters of full-time attendance at the Morgantown campus is required to complete the residency requirement.

Examinations All students must pass the Ph.D. qualifying examination given in their first year at WVU. This examination is designed to assess the basic competency of students in the chemical engineering field to determine whether or not they have sufficient knowledge to undertake independent research.

Within twelve months of passing the qualifying examination or of entering the Ph.D. program, whichever is later, the student must successfully defend an original research proposition in an oral examination. The written proposition, developed by the student alone, remains the intellectual property of the student and must be on a topic unrelated to the student's own research work for the dissertation.

Research Proposal A student must receive acceptance of a written dissertation research proposal and must also successfully defend this proposal to the student's AEC. This requirement must be completed within six months of passing the qualifying examination or of entering the Ph.D. program, whichever is later. The research work for the doctoral dissertation should show a high order of originality on the part of the student and must offer an original contribution to the field of engineering science.

A student who has successfully completed all course work, passed the qualifying examination, and successfully defended the original research proposition and research proposal is defined as one who is a candidate for the Ph.D. degree.

In order to complete the Ph.D. requirements, a student must pass a final oral examination on the results embodied in the dissertation. This examination is open to the public and, in order to evaluate critically the student's competency, may include testing on material in related fields, as deemed necessary by the AEC. In addition, since the Ph.D. degree is primarily a research degree that embodies the results of an original research proposal and represents a significant contribution to scientific literature, the student must submit a manuscript on this research to the AEC.

Chemical Engineering (CH E)

212. *Biochemical Separations*. 3 HR. PR: CHE 112 or consent. Modeling and design of separation processes applicable to recovery of biological products. Topics include filtration, centrifugation, extraction, adsorption, chromatography, electrophoresis, membranes, crystallization, examples from industry. 3 HR. lec.

220. *Particle Processing*. 4 HR. PR: CHEM 141 or CHEM 246 or CHE 142 or MAE 101 or MAE 141. Processes of particle processing such as size separation, size reduction, dewatering, and concentration; flotation of oxide and sulfide minerals. Plant practice for the processing of minerals will be covered by example. (3 HR. lec./ 1 HR. lab.)

221. *Extractive Processing*. 4 HR. PR: CHEM 141 or CHEM 246 or CHE 142 or MAE 101 or MAE 141. Topics include the basic mechanisms of unit processes of leaching, solvent extraction, and electrowinning; roasting, smelting, and refining. (3 HR. lec./ 1 HR. lab.)

224. *Coal Conversion Engineering*. 3 HR. PR: CHEM 134; Coreq: CHE 112, 172. Coal conversion processes from the unit-operations approach; thermodynamics, kinetics, and evaluation of system requirements and performance. 3 HR. lec.

255. *Electronic Mtl's Processing*. 3 HR. PR: Junior standing in Engineering and Mineral Resources. The design and application of thermal, plasma, and ion assisted processing methodologies; solid state, gas phase, surface, and plasma chemistry underpinnings, thin film nucleation and growth and growth; the effect of processing methods and conditions on mechanical, electrical, and optical properties. (Date effective — spring, 1999).

256. *Polymer Processing*. 3 HR. PR: Junior standing in Engineering and Mineral Resources. Flow behavior in idealized situations; Extrusion; Calendering; Coating; Injection molding; Fiber spinning; Film blowing; Mixing; Heat and mass transfer; Flow instabilities. (Date effective—fall, 1999).

257. *Polymer Composites Processing*. 3 HR. PR: Junior standing in Engineering and Mineral Resources. Advantages and application of polymer composites; Chemistry and kinetics of the thermosetting polymers; Hand lay up and spray up; Compression molding; Resin transfer molding; Reaction injection molding; Filament winding; Pultrusion. (Date effective—fall, 1998).

258. *Polymer Science and Engineering*. 3 HR. PR: CHEM 134. Coreq: CHE 145. Polymer classification, polymer synthesis, molecular weights and experimental techniques, thermodynamics, rubber elasticity, mechanical behavior, crystallization, diffusion, rheology, extrusion and injection molding. 3 HR. lec.

260. *Chemical Process Safety*. 3 HR. PR: CHE 41 or consent. Introduction to safety, health and loss prevention in the chemical process industry; regulations, toxicology, hazard identification, system safety analysis and safety design techniques. 3 HR. lec.

265. *Interfacial Phenomena*. 3 HR. PR: CHE 145, CHEM 246 or consent. Processes occurring at fluid/fluid and fluid/solid interfaces. Interfacial tension, contact angle, wetting, transport phenomena near interfaces, properties and stability of colloids, colloid transport phenomena, surfactants, micelles and emulsions. 3 HR. lec.

272. *Biochemical Engineering*. 3 HR. PR: CHE 172 or consent. Kinetics of enzymatic and microbial reactions, interactions between biochemical reactions and transport phenomena, analysis and design of bioreactors, enzyme technology, cell cultures, bioprocess engineering. 3 HR. lec

280. *Chemical Engineering Problems*. 0-6 HR. For juniors, seniors, and graduate students. For students desiring to take only a portion of a course, for individual projects, for subjects not covered in other courses.

301. *Transport Phenomena*. 3 HR. PR: Consent. Introduction to equations of change (heat, mass and momentum transfer) with a differential balance approach. Use in Newtonian flow, turbulent flow, mass and energy transfer, radiation, convection. Estimation of transport coefficients. 3 HR. lec.

330. *Process Dynamics and Control*. 3 HR. PR: Consent. Dynamic response of processes and control instruments. Use of Laplace transforms and frequency response methods in analysis of control systems. Application of control systems in chemical reactors, distillation, and heat transfer operations. Introduction to nonlinear systems. 3 HR. lec.

331. *Mathematical Methods in Chemical Engineering*. 3 HR. PR: MATH 18 and consent. Classification and solution of mathematical problems important in chemical engineering. Treatment and interpretation of engineering data. Analytical methods for ordinary and partial differential equations, including orthogonal functions and integral transforms. Vector calculus. 3 HR. lec.

338. *Advanced Numerical Methods*. 3 HR. PR: CHE 38 or consent. Methods for nonlinear algebraic equations, methods for initial and boundary value ordinary differential equations, methods for parabolic, hyperbolic, and elliptical partial differential equations, numerical stability and methods for stiff equations, optimization techniques. 3 HR. lec.

344. *Thermodynamics*. 3 HR. PR: Consent. Logical development of thermodynamic principles. These are applied to selected topics including development and application of the phase rule, physical and chemical equilibria in complex systems, and nonideal solutions. Introduction to nonequilibrium thermodynamics. 3 HR. lec.

345. *Chemical Reaction Engineering*. 3 HR. PR: Consent. Homogeneous and heterogeneous reaction systems, batch and flow ideal reactors, macro- and micro-mixing, non-ideal reactors, diffusion and reaction in porous catalysts, reactor stability analysis, special topics. 3 HR. lec.

351. *Fluidization Engineering*. 3 HR. PR: Consent. Fundamentals of fluidization, two-phase flow theory and powder characteristics, structure and property of the emulsion phase and bubbles, mass- and heat-transfer in fluidized beds with and without chemical reaction. 3 HR. lec.

352. *Powder Technology*. 3 HR. PR: Consent. Characterization of powders, structure of powders, powders in two-phase flow, measurement techniques, static and dynamic behavior of powders, grinding and agglomeration, chemistry of powders. 3 HR. lec.

356. *Polymer Rheology*. 3 HR. Qualitative behavior of polymeric liquids; Rheometry; stress, strain and rate of strain tensors; Equations of motion; Hookean solids and Newtonian liquids, Linear viscoelasticity; constitutive equations for solutions and melts. 3 hr. lec.

360. *Corrosion Engineering*. 3 HR. PR: CHE 142 or CHEM 141 or equivalent. Basic mechanisms of various types of corrosion such as galvanic corrosion, pitting corrosion and stress corrosion cracking; methods of corrosion prevention such as cathodic and anodic preventions, by using coatings and inhibitors and by selecting proper alloys. 3 HR. lec.

387. *Materials Engineering*. 3 HR. A study of materials engineering fundamentals emphasizing semiconductor, polymer, metal, and ceramic/cementitious material systems. Mechanical and physical properties, theoretical aspects, testing, design criteria, manufacturing, and economics of material systems. Laboratory testing and evaluation. (Equivalent to CE 387, EE 387, EM 387, IMSE 387, and MAE 387.) 3 HR. lec.

391. *Advanced Topics*. 1-6 HR. PR: Consent. Investigation of topics not covered in regularly scheduled courses.

397. *Research*. 1-15 HR.

400. *Chemical Engineering Seminar*. 1-6 HR. Seminars on current research by visitors and graduate students.

402. *Advanced Fluid Dynamics*. 3 HR. PR: Consent. Analysis of flow of fluids and transport of momentum and mechanical energy. Differential equations of fluid flow; potential flow, laminar boundary-layer theory, and non-Newtonian fluids. 3 HR. lec.

404. *Advanced Heat Transfer*. 2-5 HR. PR: Consent. Theory of transport of thermal energy in solids and fluids as well as radiative transfer. Steady-state and transient conduction; heat transfer to flowing fluids; evaporation; boiling and condensation; packed-and fluid-bed heat transfer. 3 HR. Lec.

406. *Advanced Mass Transfer*. 2-5 HR. PR: Consent. Theory of diffusion, interphase mass-transfer theory, turbulent transport, simultaneous mass and heat transfer, mass transfer with chemical reaction, high mass-transfer rates, multicomponent macroscopic balances. 3 HR. lec.

432. *Optimization of Chemical Engineering Systems*. 3 HR. PR: Consent. Optimization in engineering design, unconstrained optimization and differential calculus, equality-constraints optimization, search technique, maximum principles, geometric and dynamic programming, linear and nonlinear programming, calculus of variations. 3 HR. lec.

444. *Applied Statistical and Molecular Thermodynamics*. 3 HR. PR: CHE 344 and consent. The connection between microscopic phenomena (thermodynamics) and microscopic phenomena (statistical and quantum mechanics). Thermodynamics modeling for process analysis. Equations of state, perturbation theories, mixing rules, computer simulation, group-contribution models, physical-property prediction. 3 HR. lec.

446. *Catalysis*. 3 HR. PR: CHE 345 or consent. Physical and chemical properties of catalytic solids, nature and theories of adsorption, thermodynamics of catalysis, theories of mass and energy transport, theoretical and experimental reaction rates, reactor design and optimization. 3 HR. lec.

447. *Non-Catalytic Solid-Fluid Reactions*. 3 HR. PR: CHE 345 or consent. Reaction models, pseudo-steady-state approximation, effectiveness factor, transport and chemical reaction properties, geometric, thermal and transitional instabilities, simultaneous multiple reactions, selectivities in fixed-, moving- and fluidized-bed reactor design. 3 HR. lec.

480. *Advanced Independent Study*. 1-6 HR. PR: Consent. Designed to increase the depth of study in a specialized area of chemical engineering.

491. *Special Topics*. 1-6 HR. PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

492. *Directed Study*. 1-6 HR.

493. *Special Topics*. 1-6 HR.

495. *Independent Study*. 1-6 HR.

496. *Graduate Seminar*. 1 HR.

497. *Research*. 1-15 HR.

Civil and Environmental Engineering

David Martinelli, Ph.D., Interim Chairperson

623 Engineering Sciences Building

e-mail: cee-info@cemr.wvu.edu

web: <http://www.cemr.wvu.edu/~wwwce/>

Degrees Offered:

Master of Science in Civil Engineering

Master of Science in Engineering with a major in Civil Engineering

Doctor of Philosophy with a major in Civil Engineering

The Department of Civil and Environmental Engineering offers the master of science in civil engineering (M.S.C.E.). In conjunction with the College of Engineering and Mineral Resources, the master of science in engineering (M.S.E.), and the doctor of philosophy degrees are available with emphases in civil engineering.

The Department of Civil and Environmental Engineering has a full-time faculty of 19, who are active in teaching, research, and professional commitments.

Areas of Emphasis

There are four major areas of interest of the faculty and graduate studies:

- Environmental engineering and water resources, which include occupational health, solid-hazardous waste management and site remediation, water supply and pollution, groundwater hydraulics, and hydrology.
- Geotechnical, environmental geotechnology, and materials engineering, which covers soil mechanics, foundations engineering, soil-structure interaction, groundwater and seepage, geosynthetics, contaminant transport, landfill design, and earthwork design, as well as construction materials and waste product utilization.
- Transportation engineering, which includes transportation systems principles, design and planning, and expert systems.
- Structural engineering, which involves work and study in advanced structural analysis, bridge engineering, building design, construction materials, and composite construction materials.

Faculty

With few exceptions, the members of the faculty are licensed professional engineers registered in one or more states and are involved in state, regional, and national professional organizations, serving on numerous technical committees. They are successful researchers and have published extensively in technical journals. The civil engineering faculty produces graduates who can assume the problem solving, decision making, and technical leadership roles of a professional engineer and who have the sound educational background for the continuing professional development the field requests.

Students tailor their program of study to satisfy their own special interests, with guidance from a faculty advisor. Opportunities abound within the master's and doctoral tracks for a research experience which provides a chance for a student to tackle an engineering problem individually, with guidance from a faculty advisor. The graduate program in civil engineering was established with the aim of developing its students' abilities to use today's contemporary methods of engineering analysis and design to solve tomorrow's engineering problems.

Application

An application package can be obtained from the Graduate Program Director, Department of Civil and Environmental Engineering, West Virginia University, P.O. Box 6103, Morgantown, WV 26506-6103.

Admission

To be eligible for admission into the M.S.C.E. degree program, a candidate must hold or expect to receive a B.S.C.E. degree from either an accredited ABET curriculum or an internationally recognized program. Candidates with superior academic records and a baccalaureate degree in another engineering field, mathematics, or science may be eligible for admission into any of the masters programs offered by the department but will normally be required to attain a baccalaureate level of proficiency in certain engineering areas of the department. **An engineering technology (non-calculus based) degree is not sufficient qualification for admission into any of the graduate programs offered by the department.**

To be eligible for admission into the Ph.D. degree program, a candidate must hold or expect to receive an M.S. degree in some discipline of engineering from an institution which has an ABET accredited undergraduate program in engineering or an internationally recognized program in engineering.

The other requirements for admission into the graduate programs of the department are summarized as follows:

- To be admitted as a regular graduate student, an applicant must have a grade-point average of 3.0 or better (out of a possible 4.0) in **all** previous college work and must meet all other requirements below.
- The applicant must first submit, to the Office of Admissions and Records of West Virginia University, a completed application, application fee, and transcripts of all college work completed (directly from the institution).
- Each applicant is required to have three reference letters (using standard forms available from the department) sent directly to the department; at least two of the three references should be from the institution the applicant last attended.
- A minimum score of 550 on the TOEFL is required of all applicants from countries where the native language is not English. (Students who have completed a recent four year bachelor's degree in the USA need not submit these scores.)
- All applicants who have not received their undergraduate degree in the United States are required to submit GRE General Test scores with the Engineering Subject Test score being optional.

Provisional Admission An applicant who is not qualified for regular graduate student admission status, due either to insufficient grade-point average, incomplete credentials, or inadequate academic background, can be admitted as a provisional student. Requirements for attaining regular student status must be stated in the letter of admission. Provisional students must sign a contract, which lists these requirements in detail, no later than their first registration.

Program Outlines Students must comply with rules and regulations as outlined in the general requirements for graduate work. Each candidate will, with the approval and at the discretion of the graduate committee, follow a planned program which must conform to one of the following outlines:

- A minimum of 30 semester credit hours, not more than six of which are in research leading to an acceptable thesis.
- A minimum of 33 semester credit hours, not more than three of which are in research leading to an acceptable problem report.
- A minimum of 36 semester credit hours, with no thesis or problem report required.

No rigid curricula are prescribed for the degrees of master of science in civil engineering and master of science in engineering. Graduate-level work in mathematics, mechanics, or other appropriate areas of science is customary; however, at least 15 semester hours of credit should normally be selected from graduate civil engineering courses.

Thesis A thesis or problem is normally required of all candidates. While required credit in research (C E 497) is devoted to the thesis or report preparation, the thesis or problem report is not automatically approved after the required number of semester hours of research work have been completed. The thesis or problem report must conform with the general WVU requirements for graduate study and with any additional requirements established by the department.

Examinations A candidate shall be required to pass an examination which may be written or oral or both, to be administered by the student's advisory and examining committee. The examination shall cover course material and the thesis or problem report, depending upon the program followed.

Approval for the M.S.C.E. degree is restricted to those holding a baccalaureate degree in civil engineering.

Master of Science in Engineering

The master of science in engineering program is available to students approved for the graduate program who possess a baccalaureate degree in a technical area other than civil engineering. Students entering this graduate program must complete appropriate undergraduate work as specified by departmental regulations. This degree program is administered by the College of Engineering and Mineral Resources; the program may emphasize civil engineering.

Doctor of Philosophy

The doctor of philosophy degree is administered through the College's interdisciplinary program; civil engineering may be the major. A candidate for the degree of doctor of philosophy must comply with the rules and regulations outlined in the general requirements of the College of Engineering and Mineral Resources. The research work for the doctoral dissertation must show a high degree of originality on the part of the student and must constitute an original contribution to the art and science of civil engineering.

Civil Engineering (C E)

201. *Principles of Boundary Surveying*. 3 HR. PR: CE 105 or consent. A study of the retacement requirements for a metes and bounds survey system. The study will include the interpretation and writing of property descriptions, legal principles related to boundary establishment, and analytical approaches to boundary location. 3 HR. lec.

212. *Concrete and Aggregates*. 3 HR. PR: CE 110 or consent. Considerations and methods for the design of concrete mixes. Properties of portland cement and aggregates and their influence on the design and performance of concrete mixtures. Testing of concrete and aggregate and the significance of these tests. 2 HR. lec., 3 HR. lab.

213. *Construction Methods*. 3 HR. PR: Junior or senior standing in civil engineering. Study of construction methods, equipment, and administration with particular emphasis on the influence of new developments in technology. 3 HR. lec.

220. *Computational Fluid Mechanics*. 3 HR. PR: CE 121 and ENGR 2 or consent. Use of the computer in elementary hydraulics, open channel flow, potential flow, and boundary layer flow, numerical techniques for solution of algebraic equations, ordinary differential equations, and partial differential equations. 3 HR. lec.

225. *Engineering Hydrology*. II. 3 HR. PR: CE 121 or consent. Scientific basis of the hydrologic cycle and its engineering implications; rainfall-runoff process, hydrographs, flood routing, and statistical methods. 3 HR. lec.

227. *Water Resources Engineering*. II. 3 HR. PR: CE 225. Application of hydrologic and hydraulic principles in the design and analysis of water resource systems; probability concepts and economics in water resource planning, water law, reservoir operations, hydraulic structures, flood-damage mitigation, hydroelectric power, and drainage. 3 HR. lec.

231. *Highway Engineering*. 3 HR. PR: CE 132 and CE 181. Highway administration, economics and finance; planning and design; subgrade soils and drainage; construction and maintenance. Design of a highway. Center-line and grade-line projections, earthwork and cost estimate. 2 HR. lec., 3 HR. lab.

233. *Urban Transportation Planning and Design*. 3 HR. PR: CE 132 or consent. Principles of planning and physical design of transportation systems for different parts of the urban area. Land use, social, economic, and environmental compatibilities are emphasized. Evaluation and impact assessment.

235. *Railway Engineering*. 3 HR. PR: CE 105. Development and importance of the railroad industry. Location, construction, operation, and maintenance. 3 HR. lec.

243. *Environmental Science and Technology*. I. 3 HR. PR: Engineering major. Issues of global atmospheric changes, minimization and control of hazardous wastes, groundwater contamination, water pollution, air pollution, solid waste control, and management of water and energy resources. 3 HR. lec.

245. *Properties of Air Pollutants*. 3 HR. PR: Consent. Physical, chemical, and biological behavioral properties of dusts, droplets, and gases in the atmosphere. Air pollutant sampling and analysis. Planning and operating air pollution surveys. 2 HR. lec., 3 HR. lab.

247. *Environmental Engineering Design*. I. 3 HR. PR: CE 147. Process design of treatment/remediation systems; comparison of alternatives and preliminary cost evaluation. 2 HR. lec., 3 HR. lab.

251. *Public Health Engineering*. 3 HR. PR: Consent. Engineering aspects involved in control of the environment for protection of health and promotion of comfort of humans. Communicable disease control, milk and food sanitation, air pollution, refuse disposal, industrial hygiene, and radiological health hazards. 3 HR. lec.

261. *Structural Analysis 2*. I, II. 3 HR. PR: CE 161 or consent. Fundamental theory of statically indeterminate structures; analysis of indeterminate beams, frames, and trusses by stiffness and flexibility methods; study of influence lines for beams, frames, and trusses. 3 HR. lec.

270. *Reinforced Concrete Design*. 3 HR. PR: CE 110 and CE 161. Behavior and design of reinforced concrete members. Material properties; design methods and safety consideration; flexure; shear; bond and anchorage; combined flexure and axial load; footings; introduction to torsion, slender columns, and prestressed concrete. 2 HR. lec., 3 HR. lab.

271. *Steel Design*. 3 HR. PR: CE 110 and CE 161. Design of steel bridge and building systems with emphasis on connections, beams, columns, plastic design, and cost estimates. 3 HR. lec.

274. *Timber Design*. 3 HR. PR: CE 110 and CE 161. Fundamentals of modern timber design and analysis. Topics include wood properties, design of beams, columns, trusses, and pole structures using dimension lumber, glue-laminated products, and plywood. 3 HR. lec.

275. *Transportation Systems Rehabilitation and Maintenance*. 3 HR. Introduction to rehabilitation and maintenance of transportation infrastructure; definitions, issues and problems; environmental impact, pavement and bridge maintenance and rehabilitation methods with special consideration of stability, scour, and subsidence. 3 HR. lec.

276. *Conceptual Design of Structures*. I. 3 HR. PR: CE 161 or consent. Classification, function, and conceptual analytical understanding of structural systems and components; design codes and modeling of loads; behavior of components and systems; design principles of structural systems. 3 HR. lec.

281. *Foundation Engineering*. I, II. 3 HR. PR: CE 181. Subsurface investigations and synthesis of soil parameters for geotechnical design and analysis, concepts of shallow and deep foundation design, geotechnical design of conventional retaining walls, computerized analysis and design of soil/foundation interaction; case histories. 3 HR. lec.

283. *Earthwork Design*. 3 HR. PR: CE 181. Use of soil mechanics principles in the analysis, design and construction of earth structures. Principles of compaction and compaction control; an introduction to slope stability analysis and landslides; earth reinforcement systems, and ground improvement techniques. 3 HR. lec.

284. *Geotechnical Engineering Field Methods*. II. 3 HR. PR: CE 181. Soil exploration and groundwater sampling; in-situ determination of properties using the split spoon, cone, dilatometer, pressuremeter, and vane equipment. Instrumentation for monitoring field performance and challenges associated with exploration and monitoring in geotechnical/geoenvironmental engineering. 3 HR. lec.

290. *Civil Engineering Problems*. 1-6 HR. PR: Junior or senior standing. Special topics in various aspects of civil engineering analysis, design, and construction.

311. *Pavement Design*. 3 HR. PR: CE 281 or consent. Effects of traffic, soil, environment, and loads on the design and behavior of pavement systems. Design of pavement systems. Consideration of drainage and climate. Pavement performance and performance surveys. 3 HR. rec.

320. *Groundwater Dynamics*. 3 HR. PR: Consent. Introduction to groundwater, formulation of equations for saturated and unsaturated flow, analytical solutions for steady and transient cases, transport of pollutants and numerical techniques. 3 HR. rec.

322. *Free Surface Hydrodynamics*. I. 3 HR. PR: CE 122 or consent. The dynamics of liquid flow with a free surface under the influence of gravity; open channel hydraulics, wave motion, and buoyancy effects. 3 HR. lec.

328. *Groundwater Contaminant Transport*. I. 3 HR. PR: CE 320. Solute and particle transport; aqueous geochemistry; mathematics of mass transport; transformation; retardation, and attenuation of solutes; modeling contaminant transport and remediation. 3 HR. lec. (Every third year.)

332. *Airport Planning and Design*. 3 HR. PR: CE 132 or consent. Financing, air travel demand modeling, aircraft trends, traffic control, site selection, ground access, noise control, geometric design, pavement design, terminal facilities. 3 HR. rec.

333. *Geometric Design of Highways*. 3 HR. PR: Consent. The theory and practice of geometric design of modern highways. Horizontal and vertical alignment, cross-slope, design speed, sight distances, interchanges, and intersections. Critical analysis of design specifications. 2 HR. lec., 3 HR. lab.

334. *Introduction to Traffic Engineering*. 3 HR. PR: CE 132 or consent. The purpose, scope, and methods of traffic engineering. Emphasis on the three basic elements of each element and interactions between the elements. Laboratory devoted to conducting simple traffic studies, solving practical problems, and designing traffic facilities. 2 HR. lec., 3 HR. lab.

336. *Highway Planning*. 3 HR. PR: Consent. Theory and practice of highway investment decision-making with emphasis on quantitative techniques of traffic assignment and travel demand forecasting, system evaluation, establishing priorities and programming. Both rural and urban highway systems are considered. 3 HR. rec.

337. *Public Transportation Engineering*. 3 HR. PR: Consent. Design of rail and highway models for urban and rural areas. Consideration of vehicle technology, facility and route design, conventional and paratransit services, and related marketing, finance and coordination issues. 3 HR. rec.

338. *Highway Safety Engineering*. 3 HR. PR: CE 231 or consent. Relationship between human, vehicular, and roadway factors which impact safety; functional requirements of highway safety features; legal aspects; accident analysis; evaluation of highway safety projects. 3 HR. rec.

339. *Traffic Engineering Operations*. 3 HR. PR: CE 334. Theory and practice of application of traffic engineering regulations; traffic control concepts for urban street systems and freeways; freeway surveillance and incident management; driver information systems; traffic control system technology and management. 3 HR. rec.

349. *Solid Waste Disposal*. 3 HR. PR: Consent. Patterns and problems of solid waste storage, transport, and disposal. Examinations of various engineering alternatives with appropriate consideration for air and water pollution control and land reclamation. Analytical approaches to recovery and reuse of materials. 2 HR. lec., 3 HR. lab.

350. *Sanitary Chemistry and Biology*. 3 HR. PR: CE 122 or consent. Study of physical and chemical properties of water. Theory and methods of chemical analysis of water, sewage, and industrial wastes. Biological aspects of stream pollution problems. 2 HR. lec., 3 HR. lab.

356. *Principles of Biological Waste Treatment*. 3 HR. PR: CE 350 or consent. Examination of biological treatment systems related to microbiology and function. Models used to describe system behavior and kinetics are developed. Laboratory and field experiments are performed to understand the relation between operation and design. 2 HR. lec., 3 HR. lab.

361. *Statically Indeterminate Structures*. 3 HR. PR: CE 261 or consent. Force and displacement methods of analysis; energy principles and their application to trusses, frames, and grids; effects of axial forces; influence lines for frames, arches, and trusses; secondary stress analysis. 3 HR. rec.

363. *Introduction to Structural Dynamics*. 3 HR. PR: CE 361 or CE 460. General theory for dynamic response of systems having one or several degrees of freedom. Emphasis on the application of dynamic response theory to structural design. 3 HR. rec.

364. *Nondestructive Material and Structural Evaluations*. II. 3 HR. PR: Consent. Nondestructive evaluation (NDE) using techniques based on mechanical and electromagnetic wave propagation; theory and applications of various NDE techniques including infrared thermography, dynamic characterization, seismic reflection and refraction, ultrasonics, acoustic emission, and radar. 3 HR. lec.

366. *Advanced Materials for Infrastructure*. I. 3 HR. PR: CE 270 and CE 271. Introduction to principles of material science; material structure, characterization at coupon and component level, practical information on fiber reinforced shapes; establishment of failure analysis and standardization. 3 HR. lec.

373. *Prestressed Concrete*. 3 HR. PR: CE 261 and CE 270 or consent. Behavior and design of prestressed concrete members. Materials, bending, shear, torsion, methods of prestressing, prestress losses, deflections, compression members, composite members, indeterminate structures. 3 HR. rec.

380. *Soil Properties and Behavior*. 3 HR. PR: CE 281 or consent. Soil mineralogy and the physicochemical properties of soils and their application to an understanding of permeability, consolidation, shear strength, and compaction. Prediction of engineering behavior of soils in light of physicochemical concepts. 3 HR. rec.

381. *Soil Testing*. 3 HR. PR: CE 181 or consent. Experimental evaluation of soil properties and behavior. Emphasis is placed on the proper interpretation of experimental results and application of such results to practical problems. 1 HR. lec., 6 HR. lab.

382. *The Finite Element Method*. II. 3 HR. PR: Graduate standing in CE or MAE or consent. Introductory treatment of theoretical basis of finite element method, mathematical formulation, different types of elements, stress analysis in solids, applications, and computer implementation.

385. *Airphoto Interpretation*. 3 HR. Study of techniques for obtaining qualitative information concerning type and engineering characteristics of surficial materials. Use of airphoto interpretation for evaluation of engineering problems encountered in design and location of engineering facilities. 3 HR. rec.

387. *Materials Engineering*. 3 HR. A study of materials engineering fundamentals emphasizing semiconductor, polymer, metal, and ceramic/cementitious material systems. Mechanical and physical properties, theoretical aspects, testing, design criteria, manufacturing, and economics of material systems. Laboratory testing and evaluation. (Equivalent to CHE 387, EE 387, EM 387, IMSE 387, and MAE 387.)

391. *Advanced Topics*. 1-6 HR.

393. *Advanced Finite Element Methods*. 3 HR. PR: Consent. Formulation procedures and applications of finite element methods to two- and three-dimensional problems, techniques for nonlinear analysis computer implementation; applications in field problems, flow, and dynamics.

397. *Research*. 1-15 HR.

421. *Environmental Fluid Mechanics*. II. 3 HR. PR: Consent. Equations of motion including buoyancy and Coriolis force; mechanics of jets and plumes; diffusion, dispersion, and mixing in rivers, lakes, reservoirs, and estuaries. 3 HR. lec. (Every third year.)

427. *Wastewater System Conveyance*. I. 3 HR. PR: CE 122 or equivalent, or consent. Water and wastewater flows and measurement, design of water transportation systems, design of gravity-flow sanitary sewers and stormwater drainage systems, pumps and pump systems, and design of pumping stations. 3 HR. lec.

432. *Transportation Systems Analysis*. 3 HR. PR: Consent. Systematic examination of the interaction between transport technology, activity systems, and traffic flows. Quantitative analysis of the relationship among vehicle cycles, networks, congestion, choice behavior, cost functions, and resulting travel-market equilibration. 3 HR. rec.

440. *Deterministic Hydrology*. 3 HR. PR: Consent. An in-depth treatment of the dynamics of the accumulation of runoff, including the formulation of the unsteady surface flow equations and the unsteady saturated-unsaturated subsurface flow equations. Both analytical and numerical solutions are presented with applications. 3 HR. rec.

441. *Stochastic Hydrology*. 3 HR. PR: Consent. The use of probabilistic and random processes techniques in the study of hydrologic problems, including multivariate time series and frequency-domain analyses of hydrologic data, and stochastic modeling of multidimensional hydrologic processes. 3 HR. rec.

450. *Environmental Systems Engineering*. 3 HR. PR: CE 252 or consent. Mathematical and computer modeling of environmental systems with emphasis on decision-making; applications will be selected from some or all of the following areas: water quality, water resources planning, solid waste management, waste treatment. 3 HR. rec.

452. *Water Treatment Theory*. 3 HR. PR: CE 350. Theory of various procedures and techniques utilized in treatment of water for municipal and industrial use. Review of water quality criteria. Design of water purification facilities. 2 HR. lec., 3 HR. lab.

454. *Industrial and Advanced Waste Treatment*. 3 HR. PR or Conc.: CE 350 or consent. Basis physical and chemical unit operations used in industrial and advanced waste treatment; applications for waste water reclamation and reuse; study of industrial wastes from standpoint of process, source, and treatment. 2 HR. lec., 3 HR. lab.

458. *Design of Sanitary Works*. 3 HR. PR: CE 121. Water supply and waste water disposal problems. Design of treatment facilities. 2 HR. lec., 3 HR. lab.

460. *Finite Element Methods in Structural Analysis*. 3 HR. PR: CE 361 or consent. Relationships of elasticity theory; definitions and basic element operations; direct and variational methods of triangular and rectangular elements related to plane stress, plane strain, and flat plates in bending; variational principles in global analysis. 3 HR. rec.

461. *Bridge Engineering*. 3 HR. PR: CE 361 or consent. Statically indeterminate trusses, continuous trusses; steel and concrete arches; long-span and suspension bridges; secondary stresses. 3 HR. rec.

462. *Numerical Analysis of Engineering Systems*. 3 HR. PR: CE 361 or consent. Numerical methods for the solution of equilibrium, eigenvalue and propagation problems of discrete and continuous structural systems with special emphasis on weighted residual techniques. 3 HR. rec.

470. *Behavior of Steel Members*. 3 HR. PR: CE 271 or consent. Elastic behavior of steel members subjected to axial load, bending, and torsion. Elastic and inelastic response of beams, columns, and beam-columns to load and the resulting design implications. Comparison with standard steel codes and specifications. 3 HR. rec.

471. *Light Gage Metal Design*. 3 HR. PR: CE 261 and CE 271 or consent. Analysis and design of light gage material systems; flexural and compression members design; investigations into post buckling strength and optimum weight systems. 3 HR. rec.

473. *Structural Design for Dynamic Loads*. 3 HR. PR: CE 363 or consent. Nature of dynamic loading caused by earthquakes and nuclear weapons blasts; nature of dynamic resistance of structural elements and structural systems; criteria for design of blast-resistance and earthquake resistant structures; simplified and approximate design methods. 3 HR. rec.

475. *Analysis and Design of Multistory Structures*. 3 HR. (May be repeated once.) PR: CE 363 and CE 270 or CE 271. Introduction; service, structural and construction systems; analysis and design for lateral and gravity forces; structural modeling; computer applications; approximate methods; connections; foundations; review of standard building codes; special topics. 3 HR. rec.
476. *Behavior of Reinforced Concrete Members*. 3 HR. PR: CE 270 or consent. Studies of actual member behavior; members in flexure, combined flexure, shear, and torsion; bond and anchorage; combined axial load and flexure; slender columns; deep beams; derivation of current code provisions. 3 HR. rec.
481. *Advanced Mechanics of Soils*. 3 HR. PR: CE 181 and CE 381 and MAE 318 or consent. Stress invariants, stress history and stress path, elastic and quasi-elastic models for soils; soil plasticity, failure theories for soils; critical state soil mechanics, and determination of construction parameters. 3 HR. lec.
482. *Advanced Foundation Analysis*. 3 HR. PR: CE 281 or consent. Study of soil-structure interaction. Applications of principles of soil mechanics and numerical methods for analysis and design of geotechnical structures: strip footings, axially and laterally loaded piles, braced excavations, sheet pile walls, tunnel lining, and buried pipes and culverts. 3 HR. rec.
483. *Advanced Earthwork Design*. 3 HR. PR: CE 283 or consent. Application of the principles of theoretical soil mechanics to the design of embankments of earth and rock. In-depth study of compaction theory, stability of natural and man-made slopes by limit equilibrium and deformation considerations. 3 HR. rec.
484. *Groundwater and Seepage*. 3 HR. PR: Consent. Flow of groundwater through soils and its application to the design of highways and dams and to construction operations. Emphasis is placed on both the analytical and classical flow net techniques for solving seepage problems. 3 HR. rec.
485. *Geotechnical Risk Assessment*. 3 HR. PR: CE 281 and CE 283 or consent. Application of probabilistic and statistical principles to geotechnical analysis and design. Random spatial variability of soil properties; decision under uncertainty; reliability of geotechnical structures. 3 HR. rec.
486. *Soil Dynamics*. 3 HR. PR: CE 380 and consent. Consideration of the simple damped oscillator, wave propagation in elastic media, dynamic field and laboratory tests, dynamic soil properties, and foundation vibrations. Introduction to geotechnical aspects of earthquake engineering. 3 HR. rec.
488. *Geotechnical Case Histories*. 3 HR. PR: CE 281 and CE 283 or consent. Application of the principles of geotechnical engineering to professional practice as taught through the case histories approach. Study of actual problems in geotechnical engineering and their solutions. 3 HR. rec.
491. *Advanced Study*. 1-6 HR. PR: Consent. Investigations in advanced subjects which are not covered in regularly scheduled courses. Study may be independent or through specially scheduled lectures.
496. *Graduate Seminar*. 1 HR. PR: Consent. Each graduate student will present at least one seminar to the assembled faculty and graduate student body of the student's program.
497. *Research*. 1-15 HR.
498. *Thesis*. 2-4 HR. PR: Consent.

Computer Science and Electrical Engineering

Lawrence A. Hornak, Ph.D., Co-Interim Chairperson

James D. Mooney, Ph.D., Co-Interim Chairperson

John M. Atkins, Ph.D., Computer Science Graduate Coordinator

Wils L. Cooley, Ph.D., Electrical and Computer Engineering Graduate Coordinator

823 Engineering Science Building

e-mail: csee-info@cemr.wvu.edu

web: <http://www.csee.wvu.edu/>

Degrees Offered:

Master of Science in Computer Science

Master of Science in Electrical Engineering

Master of Science in Engineering with a major in Computer Engineering

Master of Science in Engineering with a major in Electrical Engineering

Master of Science in Software Engineering

Doctor of Philosophy with a major in Computer Engineering

Doctor of Philosophy with a major in Electrical Engineering

Doctor of Philosophy with emphasis in Computer and Information Sciences

Faculty

The Department of Computer Science and Electrical Engineering, with 31 faculty members, 360 undergraduate students, and 162 graduate students, offers an excellent graduate program. Faculty members in the department have diverse and extensive expertise in industry, research, and graduate instruction, providing opportunities for students to pursue graduate study in either theory-oriented or application-oriented fields.

Facilities and Centers

The department has its primary office, instructional lab, and research lab space on four floors of the Engineering Sciences Building and one floor of the Engineering Research Building on the Evansdale Campus and one floor of both the Eiesland and Armstrong Halls on the Downtown Campus. The department also has research activities and facilities at the NASA IV&V Center and the Alan B. Mollohan Innovation Center of the West Virginia High-Tech Consortium Foundation in Fairmont, WV. The research facilities of the department constitute a rich and diverse resource which spans the needs of research and graduate education in computer science, computer engineering, and electrical engineering. Laboratories and Centers include the Software Research Laboratory (SRL), the Reusable Software Research Group, the Institute of Combinatorial Computing and Discrete Mathematics (jointly with the Department of Mathematics), the Lab for Advanced Information and Computation Systems (LAICS), the Computer-Aided Lumber processing Lab, the ElectroMechanical Systems Lab (EMSL), and the Power Control Systems Lab. The Microelectronic Systems Research Center (MSRC) is part of the department and affiliated with the LAICS. MSRC facilities include a microsystem fabrication lab, photonic systems lab, systems prototyping lab with CAE/CAD tool suites and workstation cluster, electronic systems test (device through systems), surface mount multilayer PCB fab, and system testbed development facility. Department faculty serve as the primary leadership and technical staff for the Concurrent Engineering Research Center (CERC) and the Institute for Software Research (ISR), both of which are university research units.

Computing Facilities

All graduate students have access to a broad variety of computing platforms for both class work and research. The Department of Computer Science and Electrical Engineering operates and maintains a variety of dedicated computer systems, clusters, and networks supporting both the instructional and research activities of the department.

These systems include numerous SUN UNIX workstation clusters as well as PC and Macintosh workstations. The department also maintains a SGI Origin 2000 six node parallel computer and has access to the WVU CM-5 Parallel Computer. An additional laboratory by Hewlett-Packard supports large databases and medical informatics. Students have access to a rich set of software packages and tool suites available either on department systems or the College of Engineering and Mineral Resources. All department, college, and university computing resources are fully networked via ETHERNET and FDDI with a campus wide ATM backbone being implemented enabling interface to the statewide ATM network. All computing systems have INTERNET access enabling worldwide connectivity and access to several additional computing services via the Pittsburgh Supercomputing Center. The University is also a member of INTERNET2, vBNS, and SURANET, of which faculty in the department are active participants.

Areas of Research

The department is enthusiastically and vigorously involved in research, technical publication, and graduate instruction at the forefront of the field. The areas of emphasis are:

- Theory of computation, including foundations, complexity, algorithm analysis, parallelism, and graph theory.
- Computer systems, including microprocessor applications, advanced computer architecture, neural networks, fuzzy logic, parallel processing, VLSI testing techniques, fault tolerant design, software metrics, and software engineering.
- Control systems, including classical and modern control theory and applications.
- Communications and signal processing, including computer networks and image processing systems.
- Electric power systems and power electronics, including stability and control, transients, and steady state analysis, real time control, protection, electric machines, drives, and advanced motion controllers, electric and hybrid electric vehicles.
- Microelectronic and Photonic Systems, including integrated circuit devices, VLSI, optoelectronics, high performance packaging, and microfabrication.
- Software Engineering, including reuse and portability, verification and validation, language issues, and user interface issues.

Theory of Computation

Research in the theory of computation covers a variety of areas ranging from foundational mathematics to analysis of the performance of algorithms. A core of faculty performs research in areas such as graph theory, topology, and discrete mathematics, partly in connection with the Institute of Combinatorial Computing and Discrete Mathematics. Another key area of interest is the development and analysis of algorithms, especially those suited for parallel and distributed systems.

Software Engineering

Software engineering is concerned with applying sound engineering principles to the design, development and maintenance of computer software. There is a long tradition of software engineering education and research in the computer science program at WVU. Some of this work has been in partnership with the Software Engineering Institute in Pittsburgh, NASA, DoD and other government agencies, and a variety of area industries. A more recent partnership has been formed with the Institute for Software Research at the West Virginia High-Tech Consortium. A major research program is located at the NASA Independent Verification and Validation facility in Fairmont, where faculty work on improving the reliability of mission-critical software systems such as those that control space missions. Extensive software engineering research is carried out by CSEE facility at the Concurrent Engineering Research Center in areas such as manufacturing and health care systems. Other faculty have worked with government agencies to develop software engineering capabilities and environments based on the

Ada language, and to explore issues of software reuse and software portability. Another key area is the development of effective user interface, including those intended for scientific visualization. Graduate courses in computer science address a wide variety of software engineering topics, such as those outlined above, and a new graduate program in software engineering further develops our strength in this area.

Computer Systems

Computer systems is a very broad area, covering hardware, firmware, and software components of complex digital systems and system components. Software and hardware systems design are among the most technologically intensive components of the CSEE curricula. A large selection of hardware and software graduate courses are offered in this category. These cover topics such as switching theory, digital communication systems, VLSI design and testing, fault-tolerant computing, computer architecture, neural networks, applied fuzzy logic, and real-time software design and development. Graduate students are encouraged to include courses in their programs of study from across the spectrum of disciplines in the department. A broad spectrum of research topics of both applied and theoretical nature are undertaken under this heading. Some examples are: software development environments for signal processing applications, parallel processing of fingerprint image comparison systems, fast adaptive routing algorithms for processor arrays, communication switching systems, information systems, computational accelerator using digital signal processing arrays, an automated lumber processing system, neural network medical and industrial applications, autonomous robotics, computer controlled electric and hybrid vehicle instrumentation, a distributed microprocessor monitoring system, knowledge-based decision support system, and microprocessor-based instrumentation. The department offers dedicated laboratories equipped with personal computers and workstations to support classroom instruction and research. A number of faculty have close cooperation with several interdisciplinary research centers at WVU such as the Concurrent Engineering Research Center, the Alternate Fuel Research Center, and the Constructed Facility Research Center.

Control Systems

The study of control systems is highly mathematical with a broad range of applications. This subject area interests those who wish to apply technology to the control of dynamical systems, for which signals from sensors, usually processed by a computer, are necessary. Consequently, the student interested in control systems will also take course work in computer systems and digital signal processing. The graduate curriculum in control and systems engineering consists of courses in both classical and modern control theory and applications, including modeling techniques in both the frequency and time domains for continuous and discrete time systems, optimal control, digital control, and estimation theory; classical techniques for control systems and design tools such as root locus, Nyquist, and Bode methods for linear time-variant systems are also included. Additional courses are available in adaptive control, large scale systems, and stochastic control. Currently, the faculty in control systems are actively involved in a number of research areas, including both sponsored and unsponsored research activities, with some projects relating to specific applications and some being of a theoretical nature and having a wide range of applications. Research projects in control and systems engineering include: research in large scale systems, design of fast-estimation algorithms for distributed systems, reduced-order systems design, application of H-infinity methods, nonlinear systems control, deconvolution methods for seismic signal processing, and application of control theory to power systems and communications.

Faculty research in the control area currently is sponsored by the U.S. Department of Energy, the National Science Foundation, the state of West Virginia, and private organizations.

Communications/Signal Processing

Communications and signal processing, though distinct topics, are alike in many ways. Communications has evolved rapidly from the basic voice telephone service to a rich set of communications systems carrying voice, data, video, and other information. The integration of computers with communications systems has enabled powerful information systems for a wide range of applications such as health care and the world wide web. Advances in signal processing theory, physical technologies, and powerful digital signal processors (DSPs) have combined to dramatically expand the applications of signal processing.

Research activities address the primary areas of theory, technology, and applications. Research in communications theory explores new principles for higher performance or improved analysis of communications systems. Signal processing theory research explores new principles for the understanding and manipulation of analog and digital signals. These theoretical foundations drive a wide range of applied research. Projects include state space approaches to adaptive equalization and optimal and robust receivers for CDMA. Research on technologies extends from basic devices through full testbed systems. Projects include photonics and high speed electronics for optical communications, advanced system packaging and interconnections for high performance systems, and parallel DSP arrays. Applications research includes information systems which integrate computing and communications for distance education, distance collaborations, medical informatics and other information-age applications. Image processing applications in areas such as pattern matching, medical imaging, and inspection systems are also investigated. The department serves as the focal point for the NSF Medical Imaging and Image Processing Research Cluster at WVU.

Electrical Power Systems

Electrical power systems historically have been an area of emphasis in the electrical engineering curriculum, and the graduate program in power systems at WVU is mature. Five graduate courses are offered on a regular basis. In addition, there are four senior elective/graduate courses: distribution, industrial power systems, power electronics, and advanced power systems analysis. Recent and current research activities include: reliability, grounding, transmission, electric transportation, modeling, stability analysis, optimal design, design of modulation controllers for multiterminal ac/dc power systems, electric drives, electric machines, advanced motion control systems, and power electronics. Externally funded projects include: robust design of modulation controllers for flexible ac/dc transmission lines, optimal design of permanent magnet brushless machines, spacecraft power storage controllers, investigation of voltage/current characteristics of MOS-controlled thyristors with static and dynamic loads, and identification and decentralized control of critical modes. These projects provide excellent support for both graduate student and faculty research. Extensive interaction with industry provides ample opportunity for direct contact with practitioners in the field.

Microelectronic and Photonic Systems

Electronic and photonic systems are advancing at a dramatic rate, enabling a wide variety of new systems ranging from consumer applications through large scale systems. Courses are offered in advanced circuit analysis, integrated circuits (both analog and digital), noise and grounding, power electronics, VLSI design, microsystem fabrication, and photonics. The research program is a "systems-integration" approach based on exploring advances in a wide range of topics contributing to advanced electronic and photonic systems. Research topics in devices and components include sensor, nano-scale structures and devices, MCTs micro-electromechanical and micro-machined components, advanced multichip module packaging, optical interconnections, optical waveguides and diffractive optics, integrated optics, and VLSI circuits. Research also draws on combinations of the above components to achieve novel system functions. Such research efforts include electronic instrumentation and control and capacitive robotic sensor systems. Systems research explores high performance system testbeds including

parallel arrays of high performance digital signal processors for computational accelerators. Much of this research is supported by the facilities of the Microelectronic Systems Research Center (<http://msrc.wvu.edu>) and Lab for Advanced Information and Computation Systems. Representative applications include communications, parallel computing, sensor-based systems, and signal/image processing. Several faculty are also engaged in cooperative interdisciplinary research projects, including projects with materials and device research in the departments of Physics and Chemical Engineering and in the Health Sciences Center.

Programs

The Department of Computer Science and Electrical Engineering offers programs leading to the master of science in computer science (M.S.C.S.), the master of science in electrical engineering (M.S.E.E.), and the master of science in software engineering (M.S.S.E.). It also offers the doctor of philosophy in computer and information sciences and participates in the College of Engineering and Mineral Resources interdisciplinary program offering the master of science in engineering (M.S.E.) and the doctor of philosophy (Ph.D.), both with specialization in electrical engineering or computer engineering. Master of science students must comply with the rules for master's degrees as set forth by both the college in the *Guidelines for Masters Degree Programs Offered in the College of Engineering and Mineral Resources* and by the department in the *Master of Science Program Guidelines*. Doctor of philosophy students must comply with the rules set forth by both the college in *The College of Engineering and Mineral Resources Doctor of Philosophy Program Guidelines* and the department in the *Doctor of Philosophy Program Guidelines*.

Master of Science in Computer Science

The master's degree is intended to qualify the student to assume a professional role in an educational, industrial, or governmental research project, teach in a junior or senior college, or undertake advanced training toward a doctorate in computer science. Because many students receive baccalaureate degrees from colleges which do not offer undergraduate programs in computer science, a student with an outstanding undergraduate record does not need a degree in computer science to enter the master's program.

Admission Requirements

Applications from students eligible for admission as regular graduate students and from foreign students are normally evaluated during January for admission to the summer session. Graduate Record Examination general test scores are required for admission into the master's program.

An applicant for admission to the master's degree program is expected to satisfy the following requirements for regular admission:

- A bachelor's degree in computer science, equivalent to that offered by this department, from an accredited college or university.
- A minimum undergraduate GPA of at least 3.0 on a 4.0 scale;
- At least a 3.0 GPA on all computer science, statistics, and mathematics work;
- A GRE score of at least the 50th percentile on the verbal, quantitative, and analytical components.

Applicants for admission to the master's degree program who do not satisfy the criteria for regular admission will be granted provisional admission if they meet the following conditions:

- A minimum of 50th percentile on the quantitative and analytical components of the GRE;
- A cumulative GPA between 2.5 and 3.0 on a 4.0 scale;
- A cumulative GPA between 2.5 and 3.0 on all computer science, mathematics, and statistics course work undertaken.

Students admitted provisionally must maintain a GPA of at least 3.0 on all course work attempted.

Applicants who do not meet the minimum criteria for admission may enroll as non-degree students and then apply for provisional admission when the criteria for provisional admission have been met.

Students admitted to the master's program who do not have an equivalent bachelor's degree in computer science may be required to enroll in one or more courses that represent deficiencies in their undergraduate curriculum. Students are minimally expected to know the material contained in the following courses:

- One year of calculus (MATH 15 and 16 or equivalent) and one semester of statistics (STAT 201 or equivalent).
- Documented knowledge of a high-level programming language such as Ada, C, C++, Java, or Pascal (CS 15, 16, and 76, or equivalent).
- Assembler language and computer organization (CS 56 or equivalent).
- Discrete mathematics (CS 26 or equivalent).
- Analysis of algorithms (CS 126 or equivalent).
- Theory of programming languages (CS 136 or equivalent).
- Software engineering (CS 176 or equivalent).
- Theory of operating systems (CS 156 or equivalent).

Program Requirements

All students in the master's program must complete the following core courses:

CS 326	Advanced Analysis of Algorithms
CS 336	Formal Specification of Languages
CS 356	Theory of Operating Systems

Students may choose either the thesis option or the problem report option. The thesis option requires 24 hours of coursework, two hours of graduate seminar, and six hours of research. At least six hours beyond the 12 hours of core courses must be taken at the 300-level or 400-level. The thesis option requires the writing of an acceptable thesis which represents research suitable for publication in a refereed journal. These are archived in the University library.

The problem report option requires 33 hours of coursework, two hours of graduate seminar, and three hours of research. At least nine hours beyond the 12 hours of core courses must be taken at the 300-level or 400-level. Students must also submit an acceptable written report describing a research project carried out by the student.

Each master's student must form a supervisory committee of at least three members. This is done when the student has made some progress on regular coursework and is ready to select a program option and define a research project. Normally this occurs during the second or third semester of a student's program. The committee must be formed by the end of the semester which precedes the student's graduation semester.

The chair of the committee must have regular graduate faculty status. In addition, for a committee overseeing a thesis, the majority of the members must have regular graduate faculty status. The committee must approve the student's program of study (coursework), proposed research, and written report. A formal meeting is held with the student and the committee at the time of its inception. At this time, the program of study is submitted and approved by the committee.

All masters students must defend their thesis or problem report at an oral exam, attended by all members of the committee. The exam typically consists of two parts: a presentation of the research (about one hour) and a question period (about one hour). The questions cover material from the research as well as from coursework.

A student who fails the oral exam may re-take the oral exam at most once, no earlier than the semester following the failure.

Master of Science in Electrical Engineering Admission

Applications for admission to the graduate program are made through the Office of Admissions and Records, P.O. Box 6009, Morgantown, WV 26506-6009. Informational inquiries may be addressed to the Graduate Coordinator of Computer Science and Electrical Engineering, P.O. Box 6109, Morgantown, WV 26506-6109.

Admission requirements for the M.S. program may be summarized as follows:

- An applicant must have an excellent record in previous college work. A minimum cumulative grade-point average of 3.0 (of 4.0), or its equivalent, is required for admission as a graduate student in electrical and computer engineering.
- All applicants must submit scores of the Aptitude Test of the Graduate Record Examination (GRE). A score of 80 percentile rank is required on the quantitative part of the test.
- All students whose native language is not English must submit Test of English as a Foreign Language (TOEFL) scores. A minimum score of 550 is required for admission. In addition, they must attend New Student Orientation and take the Michigan Test of English. The results of this test will determine if the student will be required to take English as a Foreign Language (EFL) course(s).
- An applicant not qualified for the regular graduate student admission status, due to insufficient grade-point average, incomplete credentials, or inadequate academic background, may be admitted as a provisional student. Requirements for attaining regular student status must be stated in the letter of admission. Provisional students must sign a contract listing these requirements in detail no later than their first registration.

Description

There are three options available for students to gain a master's degree: Course work only (subject to the student's AEC approval), thesis, or problem report.

Course Work/Thesis/Problem Report

Students following the course work program must take a minimum of 33 credit hours of course work plus two hours of graduate seminar. Students following the problem report option must take a minimum of 30 hours of course work, two hours of graduate seminar, and a minimum of three credit hours of research or independent study leading to a problem report. Students following the thesis option must take a minimum of 24 credit hours of course work, two hours of graduate seminar, and a minimum of six credit hours of thesis research. Those students who lack course prerequisites may require more than three semesters of full-time study to complete the degree. Students supported by research assistantships may also require more than three semesters to complete the degree and are expected to pursue the thesis option.

Students pursuing either the thesis or problem report option leading to the M.S. degree must have the thesis or problem report approved by the Advisory and Examining Committee before it be accepted. The student must also pass a final oral examination and defense of the thesis or problem report administered by the AEC.

Master of Science in Engineering Program

The master of science in engineering program is available to students who are interested in graduate work in electrical or computer engineering but hold a baccalaureate degree from another field of engineering or from another discipline. Students with a baccalaureate degree from another field of engineering or from one of the sciences should contact the department for further information. In general, a student in the M.S.E. program will be expected either to complete certain undergraduate prerequisite courses or to attain equivalent competence but may not be required to complete all of the requirements equivalent to the B.S.E.E. or B.S.C.E. degree. However, all graduate students will be required to meet the prerequisites for each course taken for credit.

Certificate in Software Engineering

The Department offers a Certificate in Software Engineering degree to provide further software engineering education to individuals who are currently working in the computer and information technology industry. This program is usually offered at evening times and off-campus locations convenient for the working professional.

Admission Requirements

Applicants for the Certificate in Software Engineering must meet the following requirements:

- A bachelor's degree in any field from an accredited University;
- Submit a resume documenting at least three years of software-related experience, OR a statement from their employer attesting to the need for them to take the program;
- Provide names and addresses of three references who are familiar with the applicant's work.

Program Requirements

The Certificate program consists of completing five approved courses.

Students who achieve a B or higher in each of the first four courses of the Certificate program will qualify to enter the Master of Science in Software Engineering program, described below. Courses taken for the Certificate program earn credit towards the Master's degree.

Master of Science in Software Engineering

The Master of Science in Software Engineering degree is intended to provide graduate level software engineering expertise to individuals who are either currently working in the computer and information technology industry or have academic credentials that provide a foundation to begin graduate work in software engineering. The Masters of Science in Software Engineering program aspires to serve both adult learners from local computer and information technology industry and traditional, resident full-time graduate students. This program is usually offered at evening times and off-campus locations convenient for the working professional. It may also be available by learning methods.

Admission Requirements

Students who have recently completed a bachelor's degree with little or no experience in the high tech industry may gain regular admission if they meet the following requirements:

- Hold a bachelor's degree in software engineering, computer science, computer engineering or an equivalent major;
- Have a minimum GPA of 3.0 on a 4.0 scale for all undergraduate coursework;
- Have a minimum GPA of 3.0 for a coursework in the major;
- Have a score of at least the 80th percentile in the quantitative component of the GRE.

Applicants who have at least three years of software-related work experience in the high-technology industry may be admitted if they meet the following requirements:

- Hold a bachelors degree in any field from an accredited University;
- Submit a resume documenting at least three years of software-related experience;
- Provide names and addresses of three references who are familiar with the applicant's work.

Applicants in this category will be initially admitted as non-degree students. These students may enroll in courses of the MSSE program, and must earn a grade of at least B in each of the first four courses in the program. Upon meeting this requirement, students will be transferred to regular status.

Program Requirements

Students pursuing a Masters of Science in Software Engineering may elect a coursework only option, a problem report option, or a thesis option. The coursework option and the problem report option require completion of a total of 33 graduate credit hours. The thesis option requires a total of 30 credit hours.

Doctor of Philosophy in Computer Engineering

Doctor of Philosophy in Electrical Engineering

Admission

Admission to the doctor of philosophy program in Computer or Electrical Engineering is open to students who qualify unconditionally for graduate study (see above under M.S. admission) and who have obtained an M.S. degree in science or engineering. In addition to transcripts and test scores required for M.S. admission, Ph.D. applicants must submit three letters of recommendation and a statement of purpose. Ph.D. applicants without a master's degree will be admitted to a master's program as the first stage in attaining the Ph.D.

All students beginning graduate study will be given an entrance interview by the graduate coordinator to assist them in choosing classes before the end of the first week of classes of the semester they arrive on campus. The interview determines if the student needs remedial course work in order to pursue a graduate degree. Subsequently, an advisory and examining committee (AEC) must be formed and a plan of study prepared before the student registers for the second semester of classes. The student must declare a primary emphasis area within the department on the plan of study, as well as the intended option (course work, report, thesis) and courses to be taken.

Students with deficiencies in their undergraduate programs may be required to take some courses as prerequisites for graduate courses. These deficiencies are usually noted as a condition for admission. However, they may also be specified as a result of the entrance interview or by the AEC.

Description

The doctor of philosophy program should be considered by those with the superior academic achievement and desire to pursue a career of research or teaching. Students interested in the Ph.D. program in electrical engineering or computer engineering should contact the department for information.

Program Length A typical Ph.D. program will take between three to four years beyond the baccalaureate degree, although scholarly achievements are more important than the length of the program, which does not depend solely on the accumulation of credit hours. The courses chosen for a program are selected to develop expertise in the student's area of interest and to strengthen knowledge of other areas that will support research endeavors.

Examinations Ph.D. students are required to pass a written qualifying examination, normally within one year of their first enrollment in the Ph.D. program. The student must complete course work requirements as specified by the AEC, at least 18 hours of which must be at the 300 and 400 level at WVU. The student is also required to pass a written and oral candidacy examination given by the AEC and to successfully defend in oral examination a written research proposal. When all required course work is completed, the qualifying and candidacy examinations are passed, and the research proposal is successfully defended, the student is formally admitted to candidacy for the Ph.D. degree. For full-time students, admission to candidacy must occur within three years of entering the Ph.D. program. After the student completes the research (at least 24 credit hours) and prepares a dissertation, the final examination consists of a public defense of the dissertation. All requirements for the degree must be completed within five years after the student has been admitted to candidacy.

Research Research work for the doctoral dissertation is expected to represent a significant contribution to engineering. It may entail a fundamental investigation into a specialized area or a broad and comprehensive system analysis or design.

Doctor of Philosophy in Computer and Information Sciences

The doctor of philosophy is a research degree rather than a coursework degree. Doctoral students are required to complete a number of advanced courses but more time is spent in original research in close association with an experienced researcher. The Ph. D. degree is intended to prepare a student for teaching and research in computer and information science for business, industry, and educational institutions.

Admission Requirements

An applicant for admission to the doctoral degree program is expected to satisfy the following requirements for regular admission:

- A bachelor's degree in computer science, equivalent to that offered by this department, from an accredited college or university;
- A minimum GPA of at least 3.0 on a 4.0 scale;
- At least a 3.0 GPA on all computer science, statistics, and mathematics coursework;
- A GRE score of at least the 50th percentile on the verbal, quantitative, and analytical components.

Applicants not satisfying these requirements should work on a master's degree in computer science before applying for admission to the Ph.D. program.

Application deadlines for the Ph.D. program are as follows:

Fall semester	March 1
Spring semester	October 1
Summer session	January 1

Applications are accepted at any time; however, no guarantee of admission can be made for a specific semester if the deadline has not been met. If applicants cannot enroll at the designated semester after a favorable admission decision, no guarantee is given that they will be permitted to enroll at a later time.

Program Requirements

A doctoral student is expected to complete a minimum of 42 hours of formal graduate-level (300-level and 400-level) coursework in computer science beyond the bachelor's degree in computer science, or its equivalent, including 18 hours of advanced (400-level) graduate coursework beyond that required for the departmental qualifying examination, with at most six of the 18 hours being in "directed reading" courses. Depending on a student's background, additional course work may be required.

Within three years of admission to the doctoral degree program, applicants must receive a high pass on each of the departmental qualifying examinations, demonstrating a breadth of knowledge in computer science. A student may receive one of three grades on each exam: *high pass*, *pass*, or *fail*. A master's student must receive at least a *pass* on all four exams. Students are permitted two sittings to pass all four exams, but need not re-take exams on which they previously received an acceptable grade. A student who fails twice may appeal to the graduate faculty of the department, who may grant a third attempt under exceptional circumstances. A Ph.D. student who does not receive a high pass on these examinations after two attempts may transfer all credits earned in the doctoral program toward acquiring a master's degree.

All doctoral students must demonstrate reading competency in scientific literature written in a language other than the student's native tongue. The choice of a foreign language other than French, German, Russian, Japanese, or Spanish must be approved by the computer science graduate faculty.

After satisfactorily passing the departmental qualifying examination, a doctoral student will be permitted to stand for the comprehensive examinations. These examinations will be prepared, administered, and evaluated by the student's dissertation committee. All examinations must take place within a span of two calendar weeks.

Usually after completion of the comprehensive examinations, the doctoral student will present a research prospectus to the dissertation committee, outlining the original research which the student is to perform. The prospectus will consist of a statement of the research problem, a review of the pertinent scientific literature in the area, and a description of the methods which will be employed by the student in an attempt to solve the research problem. After the committee has questioned the student on the prospectus and approved it as the doctoral research topic, the student will be recognized as a doctoral candidate.

After the doctoral candidate has completed the original research outlined in the prospectus, the dissertation will be presented to the dissertation committee, after which the candidate will formally defend the dissertation at a public meeting. Full degree requirements are met when the dissertation committee deems that the candidate has successfully completed the research outlined in the prospectus and has performed satisfactorily in defense of the work.

Doctoral candidates must satisfy the University's one-year residency requirement. It is expected that this one year of residency will be spent performing research after completion of the comprehensive examinations by completing nine hours of research in two consecutive semesters.

Computer Engineering (CP E)

242. *Introduction to Digital Computer Architecture*. 3 HR. PR: MATH 215, CPE 110, 111. Control, data, and demand driven computer architecture; parallel processing, pipelining, and vector processing; structures and algorithms for array processors, systolic architectures, design of architectures.

250. *Intro Microelectronic Circuits*. II. 3 HR. PR: EE 56. VLSI (Very Large Scale Integrated) circuit design, including layout, simulation and performance optimization of basic digital logic functions and combinations of such basic functions into more complex digital system functions. MAGIC CAD tools are used for projects.

254. *Digital System Testing*. II. 3 HR. PR: CPE 110 or consent. Conventional and emerging fault modeling concepts. Fault Simulation. Test generation algorithms. Design for testability. Compression testing techniques. Built in self-test. Functional testing. Boundary scan design and testing approaches.

260. *Intro to Information Systems*. II. 3 HR. PR: CPE 110. This course will provide the student with background in the principles and practice of digital communications, beginning with early digital voice systems and extending through current systems based on "information" communications, including voice, data and video.

270. *Digital Systems Design*. 3 HR. PR: CPE 71. Hierarchical design methods, from the machine architecture, through data flow concepts and control flow concepts, to implementation. Topics include: design methodology, design techniques, machine organization, control unit implementation and interface design. 3 HR. lec.

271. *Switching and Automata Theory*. 3 HR. PR: CPE 71, 110, and MATH 215. Reliable design and fault diagnosis; synchronous and asynchronous sequential machines; finite state machines with automata theory.

284. *Real-Time Systems Development*. I. 3 HR. PR: CS 156 or working knowledge of C programming language and UNIX. Characteristics of real-time systems, system and software development standards, structured and object oriented development methods for real-time systems, using a computer-aided software engineering (CASE) tool in the development of a large engineering project. Emphasis is on real-time systems requirements analysis and design. This is a project based course.

291. *Special Topics in Computer Engineering*. I, II, S. 1-3 HR. PR: Junior, senior or graduate standing or consent. Investigation of topics not covered in regularly scheduled courses.

320. *Application of Neural Networks*. II. 3 HR. PR: Consent. Theories, principles, techniques, and procedures used in design implementation of supervised and unsupervised Neural Networks. Algorithms and computer programming for software realization with engineering applications.

321. *Applied Fuzzy Logic*. I. 3 HR. PR: Consent. Theory and applications of Fuzzy Logic; Fuzzy fundamentals, Fuzzy rules, decision-making systems, control systems, pattern recognition systems, and advanced topics. Algorithms and computer programming for software realization with engineering applications.

343. *Fault Tolerant Computing*. II. (Alt yrs.) 3 HR. PR: CPE 110 or consent. Introduction to reliability analysis and Markov modeling. Computer System reliability modeling. Fault tolerant design of computer systems. Reconfiguration strategies in VLSI and WSI arrays.

351. *VLSI System Design*. I. 3 HR. Introduction to Hardware Modeling Languages. CAD tools for logic synthesis and simulation. Design methodologies. Rapid Prototyping using field programmable gate arrays. IC chip design.

370. *Switching Circuit Theory 1*. 3 HR. PR: CPE 71 or equivalent. Course presumes an understanding of the elements of Boolean or switching algebra. Study of both combinational and sequential switching circuits with emphasis on sequential networks. Advanced manual design and computer-aided design techniques for single and multiple output combinational circuits. Analysis and design of sequential circuits. Detection and prevention of undesired transient outputs. 3 HR. rec.

372. *Advanced Computer Architecture*. 3 HR. PR: CPE 71 and 110, 111 or consent. Formal tools for designing large digital systems are introduced; formal descriptive algebras such as ISP, PMS, AHPL, CDL, and others. An in-depth study of computer systems designs including instruction design and data path design. 3 HR. rec.

373. *Design of Computer Arithmetic Circuits*. 3 HR. PR: CPE 71 or equivalent. Study of logic networks usable in performing binary arithmetic. Emphasis is on design of high-speed, parallel arithmetic units using binary numbers. Consideration of systems for representation of negative numbers. Available arithmetic subsystems are studied. 3 HR. rec.

390. *Advanced Independent Study*. I, II, S. 1-6 HR. PR: Consent. Individual investigation in advanced computer engineering subjects not covered in formal course.

391. *Advanced Topics*. I, II, S. 1-6 HR. PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

397. *Master's Degree Research or Thesis*. I, II, S. 1-15 HR. PR: Consent. Research activities leading to a thesis, problem report, research paper, or equivalent scholarly project.

471. *Switching Circuit Theory 2*. 3 HR. PR: CPE 370, MATH 236, or equivalent. Switching circuit theory is used to model the operations of networks of logic gates and flip-flops. Networks of this type are one form of discrete parameter systems. Studies the use of linear sequential machine as a means of modeling the general class of discrete parameter information systems. Systems approach and the techniques of abstract algebra used throughout. 3 HR. rec.

472. *Digital Systems Design 2*. 3 HR. PR: CPE 372 or consent. Students will design a specific digital system, i.e., CPU control, interrupt structure, memory, or input/output system. They will design and test a project oriented toward one specific objective.

490. *Teaching Practicum*. 1-3 HR.

491. *Advanced Study*. 1-6 HR. PR: Consent. Investigation in advanced subjects which are not covered in regularly scheduled courses. Study may be independent or through specially scheduled lectures.

493. *Special Topics*. 1-6 HR.

495. *Independent Study*. 1-6 HR.

496. *Graduate Seminar*. 1 HR. PR: Consent. Technical presentations by faculty members, outside speakers, and graduate students. Each student will give an oral presentation describing the student's research before the student's final examination. This will typically be a 40-minute presentation before the faculty and graduate students.

497. *Research*. 1-15 HR.

499. *Graduate Colloquium*. 1-6 HR.

Computer Science (CS)

210. *C++ Programming*. I, II. 3 HR. An introduction to the C++ Programming Language. C++ constructs, designing and implementing applications in C++, using Software Engineering methodologies. Object-oriented programming techniques in C++. (High level language experience required.)

216. *Numerical Concepts*. 3 HR. PR: MATH 16. Computer arithmetic, number representation, and errors; locating roots of equations; interpolation; numerical integration and differentiation; numerical solution of initial value problems for ordinary differential equations; solving systems of linear equations; data smoothing.

228. *Discrete Mathematics 2*. II. 3 HR. PR: CS 126 and MATH 16 or equiv. Applications of discrete mathematics to computer science. Methods of solving homogeneous and non-homogeneous recurrence relations using generating functions and characteristic equations; digraphs to analyze computer algorithms; graph theory and its ramifications to computer algorithms. (Equiv. to MATH 228.)

236. *Compiler Construction*. 3 HR. PR: CS 136. Theory and practice of the construction of programming language translators; scanning and parsing techniques, semantic processing, runtime storage organization, and code generation; design and implementation of interpreter or compiler by students.

246. *Automata Theory*. 3 HR. PR: CS 126. Introduction to formal languages, grammars, and automata; regular expressions and finite automata, context-free languages and push down automata, context-sensitive languages and linear-bounded automata, and Turing machines and recursively enumerable languages.

256. *Operating Systems Structures*. 3 HR. PR: CS 156. Support of computer components; device management and interrupts, process scheduling, file management, complete OS structure, OS development and debugging, configuration management, and performance testing.

258. *Advanced Operating Systems*. 3 HR. PR: CS 256. Operating system topics not covered in CS 156 or CS 256; reliability and security, system management, and virtual machine structures; introduction to distributed and realtime systems; emphasis on design issues faced by actual systems.

266. *Computer Organization and Architecture*. 3 HR. PR: CS 156. Computer structure; emphasis on implications for software design; evolution of computers; elementary digital logic; CPU structures; memory and I/O structures; pipelining and memory management; introduction to parallel and high-level architectures.

267. *Microprocessor Structures*. 3 HR. PR: CS 156. Typical microprocessor systems including OS architecture, assembly language programming, and interfacing capabilities.

268. *Data and Computer Communications*. 3 HR. PR: CS 156. Introduction to fundamental concepts and principles of data and computer communications; digital data communication techniques, multiplexing, switching, LANs and WANs, and protocols and architecture.

272. *Senior Project*. I, II. 1-6 HR. PR: CS 176. Design and implementation of a software development project under the supervision of a computer science faculty member. Emphasis will be on requirements, specification, analysis, testing and maintenance.

276. *Advanced Software Engineering*. 3 HR. PR: CS 176. Engineering process, project economics, project organizational and management issues, configuration management.

278. *Database Design and Theory*. 3 HR. PR: CS 176. Relational data model using SQL and the relational algebra; Semantic Data Modeling using the ER model, relational database design theory.

286. *Introduction to Artificial Intelligence*. 3 HR. PR: CS 176. Survey of AI techniques, heuristic search, game playing, knowledge representation schemes: logic, semantic net, frames, rule-based; natural language processing. Advanced AI techniques/systems: planning, blackboard architecture, neural net model; AI implementation.

288. *Introduction to Computer Graphics*. 3 HR. PR: CS 76. Overview of I/O hardware, elements of graphics software, fundamental algorithms, two-dimensional viewing and transformations, design for interaction, and introduction to three-dimensional concepts.

291. *Topics in Computer Science*. I, II, S. 3 HR. PR: CS 26 and CS 56 and CS 76. Advanced study of topics in computer science.
301. *Computers in Research*. I, 3 HR. (Statistics and Computer Science majors should obtain their graduate committees' approval before registering.) Use of computers in research. Algorithms and programming. Scientific and statistical programming packages.
311. *Scientific Computing Applications*. II. 3 HR. PR: CS 76. Application of mathematical modeling and simulation methodology, languages, and systems. Discrete simulation using GPSS-V language. Linear programming. Finite difference methods using higher level languages.
315. *Advanced Mathematics of Computation*. I. 3 HR. PR: MATH 215. Foundations of computer science; formal logic, graph theory, computability and complexity theories.
320. *Solution of Nonlinear Systems*. II. 3 HR. PR: CS 216 or MATH 241. Solution of nonlinear systems of equations. Newton and Secant Methods. Unconstrained optimization. Nonlinear overrelaxation techniques. Nonlinear least squares problems. (Equiv. MATH 320.)
325. *Numerical Interpolation and Approximation*. I. 3 HR. PR: CS 216. Interpolation and approximation using Chebychev polynomials, Pade approximations, Chebychev economization of Taylor Series. Hermite interpolation, orthogonal polynomials and Gaussian Quadrature.
326. *Advanced Analysis of Algorithms*. II. 3 HR. PR: CS 126 Analysis and design techniques for efficient sequential and parallel algorithm design; NP-completeness, advanced analysis techniques, advanced algorithms, and parallel algorithms.
328. *Artificial Neural Networks*. 3 HR. PR: MATH 143 or MATH 241 or consent.; fluency in a high-level programming language. Theory of artificial neural networks (ANN) as mathematical models; techniques of linear algebra and calculus applied to understanding ANN-based learning and recall methods; introduction of several basic ANNs; ANN implementations via student-designed software.
330. *Design of Language Processors*. II. 3 HR. PR: CS 236. Study of the design and construction of automatic programming language processors. Investigation of the structure of scientific and business oriented compilers, list processors, and information processing languages.
336. *Formal Specification of Language*. I. 3 HR. PR: CS 236 Specifications of language syntax and semantics by grammars and automata and by attribute grammars, denotational semantics, and action equations; algebraic, denotational, and operational semantics, application of formal specifications to construction of software tools.
346. *Advanced Automata Theory*. II. 3 HR. PR: CS 246. Survey of automata outside the Chomsky hierarchy with applicability to parallel processing, learning, temporal logic, and language processing.
350. *Software Engineering in Data Communications*. I. 3 Hr PR: CS 256. Data communication principles, software design techniques for implementing data communication systems, testing and debugging techniques, networks and data link control, software design in a network environment. A "hands-on" project in data communications design is included.
356. *Theory of Operating Systems*. I. 3 HR. PR: CS 256 Theoretical analysis of selected aspects of operating system design; topics include interaction of concurrent processes; scheduling and resource allocation; virtual memory management; access control; and distributed and realtime system issues.
365. *Distributed Database Management Systems*. II. 3 HR. PR: CS 256. Reference architectures for distributed database management systems. Integration of local databases stored at different sites into a global database. Heterogeneity of data models. Query translation and optimization. Synchronization of concurrent access. Integrity and reliability.
366. *Advanced Computer Systems Architecture*. II. 3 HR. PR: CS 266 or CPE 272. High performance techniques, pipelined and parallel systems, and high-level architectures; comparative evaluation of architectures for specific applications; emphasis on software implications of hardware specifications.
374. *Developing Portable Software*. 3 HR. PR: CS 176 and CS 256 or consent. Issues, problems, and techniques in the practical development of portable software and in the adaptation

of programs to new environments; development of a simple interactive application; porting to several diverse computing platforms.

375. *Software Verification and Validation*. II. 3 HR. PR: CS 136 and CS 176. Principles of formal software specification; formal verification, testing, and other validation techniques.

376. *Formal Methods in Software Engineering*. I. 3 HR. PR: CS 276. Principles of rigorous specification, designing, implementation and validation of sequential, concurrent and realtime software; emphasis on reading current papers on these topics.

377. *Object-Based Software Design*. II. 3 HR. PR: CS 176. Data type and structure specification, axiomatic and model-based specification, algebraic techniques, testing and verification specifications, data abstraction facilities in modern programming languages, examples and associated algorithms.

378. *Theory of Database Systems*. I. 3 HR. PR: CS 278. Abstract and newer database models; introduction to database design techniques in the context of semantic data modeling; equivalence of different relational models; object-oriented databases.

386. *Advanced Artificial Intelligence Techniques*. II. 3 HR. PR: CS 286. Reasoning under uncertainty; nonmonotonic reasoning, statistical reasoning, fuzzy logic; planning, parallel and distributed AI, natural language processing, learning, connectionist models, temporal logic, common sense knowledge and qualitative reasoning, AI techniques and robotics.

388. *Interactive Computer Graphics*. I. 3 HR. PR: CS 126. Viewing in three dimensions, projections, rendering of surfaces and solids, illumination and shading, interaction handling, display processors and programming systems, and graphics system organization.

390. *Teaching Practicum*. I and II. 1-3 HR. PR: Consent. Supervised practices in college teaching of computer science.

391. *Advanced Topics*. I, II, S. 1-6 HR. PR: Consent. Investigation in advanced computer science subjects not covered in regularly scheduled courses. Study may be independent or through specially scheduled lectures.

396. *Graduate Seminar*. I, II. 1 HR. PR: Consent.

397. *Research in Computer Science*. I, II, S. 1-15 HR. PR: Consent.

415. *Computability and Recursive Function Theory*. 3 HR. PR: CS 315. Introduction to recursive function theory, approaches to computability, Church's thesis, decidability, recursive and recursively enumerable sets, numbering computable functions, Godel's incompleteness theorem, reducibility, and computational complexity.

418. *Information Dissemination*. 3 HR. PR: CS 326. Research issues in information dissemination in graphs; emphasis on broadcasting and gossiping algorithms, including identification and solution of open research questions.

428. *Advanced Neural Networks*. 3 HR. PR: CS 328 or equivalent. Continuation of CS 328. Unsupervised learning: Hebbian and competitive; Hamming and Euclidean distance classifiers; discussion of Hamming, Maxnet, Kohonen, and Art 1 ANN's; presentation of papers by students from research literature.

446. *Advanced Theory of Computing*. I. (Alt yrs.) 3 HR. PR: CS 326 or 346. Advanced Structural Complexity theory and its relationship to algorithmic problems. Interactive proofs, hierarchies (polynomial time, low, high) and hardness of approximation.

458. *Distributed Systems and Algorithms*. 3 HR. PR: CS 126 and CS 356. Distributed and networked operating systems and the algorithms necessary to achieve such goals as transparency, sharing, fault tolerance, and efficient process and task scheduling.

472. *Information Modeling*. 3 HR. PR: CS 278 or CS 377. Information modeling, data definition languages, graphical information models (NIAM and IDEF), computer-readable information models (EXPRESS); information exchange and sharing using STEP application protocols.

475. *Advanced Software Verification*. 3 HR. PR: CS 375. Formal and practical modular verification of functionality and performance; soundness and completeness of proof systems; module testing.

477. *Software Reuse*. 3 HR. PR: CS 375 or CS 376. Formal and practical modular verification of functionality and performance; soundness and completeness of proof systems; module testing.
478. *Advanced Databases Theory*. 3 HR. PR: 378. Design theory for relational databases; functional dependencies; multivalued dependencies and normal forms; projection mappings, tableaux and the chase; representation theory.
486. *Global Knowledge Networks*. 3 HR. PR: CS 386. Representational formalisms and effective retrieval techniques to obtain information from international knowledge repositories connected via high-speed networks.
488. *Advanced Graphics and Multimedia*. 3 HR. PR: CS 388 and fluency in C, Unix and X. Computer graphics and multimedia; raster graphic architectures, advanced raster algorithms, ray tracing, radiosity, multimedia representation, multimedia communications, and similar topics.
490. *Teaching Practicum*. I, II. 1-3 HR. PR: Consent. Supervised practice in college teaching of computer and information sciences.
491. *Advanced Study*. I, II, S. 1-6 HR. PR: Consent. Investigation in advanced subjects which are not covered in regularly scheduled courses. Study may be independent or through specially scheduled lectures.
492. *Directed Study*. I, II, S. 1-6 HR. Directed study, reading, and/or research.
496. *Graduate Seminar*. I, II. 1 HR. PR: Consent.
497. *Research*. I, II, S. 1-15 HR. PR: Consent.

Electrical Engineering (E E)

216. *Fundamentals of Control Systems*. 3 HR. PR: EE 124, Introduction to classical and modern control; signal flow graphs; state-variable characterization; time-domain, root-locus, and frequency techniques; stability criteria. 3 HR. lec.
217. *Intro to Digital Control*. I (Alt yrs.) 3 HR. PR: EE 124. Sampling of continuous-time signals and transform analysis. State-variable analysis for linear discrete-time systems and design of digital controllers.
230. *Electrical Power Distribution Systems*. 3 HR. PR: EE 131, 136 or consent. General considerations; load characteristics; subtransmission and distribution substations; primary and secondary distribution, secondary network systems; distribution transformers; voltage regulation and application of capacitors; voltage fluctuations; protective device coordination. 3 HR. lec.
231. *Power Systems Analysis*. 3 HR. PR: EE 131, 136 or consent. Incidence and network matrices, Y-Bus, symmetrical and unsymmetrical faults, load-flow and economic dispatch, MW-frequency and MVAR-voltage control. The power system simulator will be used for demonstrations. 3 HR. lec.
236. *Introduction to Power Electronics*. 3 HR. PR: EE 130 and EE 158, 159 (concurrently) or consent. Application of power semiconductor components and devices to power system problems; power control; conditioning processing, and switching. Course supplemented by laboratory problems. 3 HR. lec.
248. *Fiber Optics Communications*. 3 HR. PR: EE 126, 141, 151. Fundamentals of optics and light wave propagation, guided wave couplers, connections, and fiber networks, modulation noise and detection in communication systems. 3 HR. lec.
251. *Noise and Grounding of Electronic Systems*. 1 HR. PR: EE 158, 159 or consent. Analysis of extrinsic noise in electronic circuits. Design techniques to reduce or eliminate noise. 1 HR. rec.
252. *Operational Amplifier Applications*. 3 HR. PR: EE 158, 159. Linear integrated circuit building blocks applied to such functions as amplification, controlled frequency response, analog-digital conversion, sampling, and waveform generation. 2 HR. lec., 3 HR. lab.
254. *Introduction to Microfabrication*. I. 3 HR. PR: EE 151 or consent. Introduction to the physical processes underlying current and emerging microfabrication technology and their selective use in

the technology computer aided design (TCAD) and fabrication of electrical, optical, and micromechanical devices and systems.

255. *Fundamentals of Photonics*. I, II. 3 HR. PR: EE 141 and EE 151 or consent. Introduction to the physical models and mechanisms through which generation, characterization, and control of light is achieved. Applications including optical information processing, holographic storage, and photonic switching provide the framework for photonic concept presentation.

257. *Transistor Circuits*. 3 HR. PR: EE 158, 159 or equiv. Analysis and design of subcircuits used in analog integrated circuit modules. Transistor models, low-frequency response of multistage amplifiers, current sources, output stages and active loads. 3 HR. lec.

264. *Introduction to Communications Systems*. 3 HR. PR: EE 126. Introduction to the first principles of communications systems design. Analysis and comparison of standard analog and pulse modulation techniques relative to bandwidth, noise, threshold, and hardware constraints. Communications systems treated as opposed to individual circuits and components of the system. 3 HR. lec.

268. *Digital Signal Processing Fundamentals*. 3 HR. PR: EE 126, 127, 156, 157. Theories, techniques, and procedure used in analysis, design, and implementation of digital and sampled data filters. Algorithms and computer programming for software realization. Digital and sampled data realizations, switched capacitor and charge-coupled device IC's. 3 HR. lec.

269. *Intro to Digital Image Processing*. I. 3 HR. PR: EE 124 and EE 127. Introduction to the vision process and fundamental mathematical characterization of digitized images, 2-dimensional transform methods used in image processing, Histogram analysis and manipulation, image filtering techniques, image segmentation and morphology.

281. *Biomedical Electrical Measurements*. 2 HR. PR: EE 158 and 159 or consent. Biomedical instrumentation for human subjects. Origin and characteristics of biological electrical signals. Instrument design requirements and detailed analysis of cardiac support and intensive-care monitoring equipment. 2 HR. lec.

287. *Electric Vehicle Design*. II. 2 HR. PR: EE 21 or EE 103. Introduction to all electric and hybrid electric vehicles. Review of safety considerations, energy storage, motor and instrumentation technologies. Simulation software for energy requirements, efficiency and capabilities of EV's is required. Participation is expected in the design, construction, and testing of an EV.

291. *Special Topics in Electrical Engineering*. 1-3 HR. PR: Junior, senior, or graduate standing, or consent. The investigation of topics not covered in regularly scheduled courses. 1-3 HR. lec.

311. *Applied Nonlinear Control*. II. (Alt yrs.) 3 HR. PR: EE 216 or consent. Study of the major analytical tools that are being used to analyze and control nonlinear systems such as phase plane analysis, Lyapunov theory, describing function analysis, feedback linearization and sliding control.

314. *Stochastic Systems Theory*. 3 HR. PR: Consent. Probability distribution and density functions. Bayes rule and conditional probability. Stochastic process and linear systems. Gauss-Markov Process. Optimal linear estimation. Introduction to Wiener and Kalman filtering. Decision theory fundamentals. 3 HR. rec.

315. *Linear Control Systems*. 3 HR. PR: Consent. Basic concepts in the theory of linear control systems; state variable representation, solution of state equations, controllability, observability, stability, transfer function descriptions, design of controllers and observers. 3 HR. rec.

316. *Optimal Control*. 3 HR. PR: Consent. Methods of direct synthesis and optimization of feedback systems; Wiener theory; Pontryagin's maximum principle; dynamic programming; adaptive feedback systems. 3 HR. rec.

317. *Digital Control*. 3 HR. PR: EE 216 or equiv., or consent. Sampling of continuous-time signals; transform analysis of discrete-time systems. Translation of analog design. Controllability and observability. State-space design methods; and introduction to optimal control for discrete systems. 3 HR. rec.

330. *Advanced Electrical Machinery*. 3 HR. PR: EE 131 and EE 136 or consent. Theory and modeling of synchronous, induction, and direct-current machines, and their steady-state and transient analysis. 3 HR. rec.

333. *Comp Appl Power System Analysis*. 3 HR. PR: EE 231 or consent. Steady state analysis by digital computers of large integrated electrical power systems. Bus admittance and impedance matrices, load flow studies, economic dispatch and optimal power flow, steady state security analysis, fault studies. 3 HR. rec.

334. *Power System Control and Stability*. 3 HR. PR: EE 131 and EE 315. Review of stability theory, classical transient analysis, dynamical models of synchronous machines, power system stability under small and large perturbations, dynamic simulation of power systems. 3 HR. rec.

336. *Adv Power Electronics/Drives*. II. (Alt yrs.) 3 HR. PR: EE 236. Study of solid-state power semi-conductor devices with emphasis on their applications in power conditioned electric motor drives systems. Examination of control philosophies, steady-state models, and numerical simulation. Current topics of interest from the literature.

357. *Linear Integrated Circuits*. 3 HR. PR: EE 158, 159 or equivalent. (Primarily for students specializing in communication and electronics.) Techniques of integrated circuit design and fabrication. Development of models descriptive of linear and nonlinear transistor operation. Design and analysis of high-frequency tuned, direct-current, and differential amplifiers. 3 HR. rec.

358. *Integrated Logic Circuits*. 3 HR. PR: EE 156, 157 or equivalent, or consent. (Intended for students specializing in digital circuits.) Techniques of integrated circuit design and fabrication. Development of transistor model for nonlinear operations. Design, analysis, and comparison of emitter-coupled, direct-couples, diode-transistor, transistor-transistor integrated logic circuits. 3 HR. lec.

364. *Communication Theory*. 3 HR. PR: EE 264 or consent. Detailed study of probability theory and its use in describing random variables and stochastic processes. Emphasis on applications to problems in communication system design. 3 HR. rec.

387. *Materials Engineering*. 3 HR. A study of materials engineering fundamentals emphasizing semiconductor, polymer, metal, and ceramic/cementitious material systems. Mechanical and physical properties, theoretical aspects, testing, design criteria, manufacturing, and economics of material systems. Laboratory testing and evaluation. (Equivalent to CHE 387, CE 387, EM 387, IMSE 387, and MAE 387.)

390. *Advanced Independent Study*. 1-6 HR. PR: Consent. Individual investigation in advanced subjects not covered in formal courses.

391. *Advanced Topics*. I, II, S. 1-6 HR. PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

397. *Master's Degree Research or Thesis*. I, II, S. 1-15 HR. PR: Consent. Research activities leading to a thesis, problem report, research paper, or equivalent scholarly project.

411. *Nonlinear Control System Analysis*. 3 HR. PR: Consent. Application of Liapunov's and Popov's methods to nonlinear control systems, together with classical techniques. 3 HR. rec.

415. *Large-Scale System Modeling, Cont.* 3 HR. PR: EE 315. Characterization of large-scale systems, model simplification through aggregation and perturbation methods, optimal and chained aggregation, balanced realization and cost component procedures; optimal model reduction; simplification effects; decentralized control: feasibility and design. 3 HR. lec.

416. *Stochastic Estimation and Control*. 3 HR. PR: EE 316 or consent. Techniques of optimal estimation and control for linear systems. Balanced emphasis is placed on both continuous and discrete time systems. Some advanced topics of interest will be considered. 3 HR. rec.

430. *Real Time Control of Power System*. 3 HR. PR: EE 315 and EE 316 and EE 333. Application of computers to modern control theory for reliable and economic real-time operation of integrated power systems. 3 HR. rec.

432. *Protection of Power Systems*. 3 HR. PR: EE 231 or consent. Principles of relay protection for faults on transmission lines and other devices. Use of overcurrent, differential distance, and pilot relaying systems. Special relay applications. Determination of short-circuit currents and voltages from system studies. 3 HR. rec.

433. *HVDC Transmission*. I. (Alt yrs.) 3 HR. PR: EE 236 and EE 333. Line-commutated converter

analysis, operation of two-terminal and multiterminal dc systems, harmonics and filters, molding of ac/dc system and design of modulation controllers.

490. *Teaching Practicum*. 1-3 HR.

491. *Advanced Study*. 1-6 HR. PR: Consent. Investigation in advanced subjects which are not covered in regularly scheduled courses. Study may be independent or through specially scheduled lectures.

493. *Special Topics*. 1-6 HR.

495. *Independent Study*. 1-6 HR.

496. *Graduate Seminar*. 1 HR. PR: Consent. Technical presentations by faculty members, outside speakers, and graduate students. Each student will give an oral presentation describing the student's research before the student's final examination. This will typically be a 40-minute presentation before the faculty and graduate students.

497. *Research*. 1-15 HR.

499. *Graduate Colloquium*. 1-6 HR.

Industrial and Management Systems Engineering

Ralph W. Plummer, Ph.D., P.E., Chairperson

727 Engineering Sciences Building

e-mail: ie-info@cemr.wvu.edu

web: <http://www.cemr.wvu.edu/~wwie/>

Degrees Offered:

Master of Science in Industrial Engineering

Master of Science in Occupational Hygiene and Occupational Safety

Master of Science in Engineering with a major in Industrial Engineering

Doctor of Philosophy with a major in Industrial Engineering

Graduate programs in industrial and management systems engineering are designed to give students experience in developing innovative solutions to real problems by implementing creative ideas. Graduate students in the department are actively involved with people and organizations in need of creative solutions to real problems. Students can expect to develop their creative abilities in order to be effective in innovative environments while improving their abilities to communicate and implement new ideas.

Faculty

Faculty members of the Department of Industrial and Management Systems Engineering possess broad experience in business, teaching, and research. This combination of backgrounds enriches a student's educational experience.

Research

The department has quality research laboratories in manufacturing, robotics and vision systems, CAD/CAM, decision sciences, ergonomics, industrial hygiene, and safety engineering. Graduate students are encouraged to utilize these resources to explore and develop their capabilities.

Degree Programs in Industrial Management Systems Engineering

Three degrees are offered at the master's level: M.S.I.E., M.S.E., and M.S. with an emphasis in occupational hygiene and occupational safety. The M.S.I.E. degree program is appropriate for students with a B.S. in industrial engineering, and the M.S.E.

degree program is designed for students having a baccalaureate degree in a technical field other than industrial engineering who wish to pursue a broader, more interdisciplinary program of graduate studies. In both the M.S.I.E. and the M.S.E. degree programs, students will select courses from decision sciences and production systems, manufacturing systems, and ergonomics. A description and listing of requirements for the M.S. in occupational hygiene and occupational safety, which is administered by the Department of Industrial and Management Systems Engineering, is presented below.

An undergraduate degree in either another engineering field or the basic sciences is required for admission to both the M.S.E. and M.S. programs. Students trained in the areas of mathematics, statistics, physics, computer science, and engineering majors are generally well prepared for graduate study with an emphasis in decision sciences/operations research techniques or production systems, while many chemistry, biology, and engineering majors will find excellent career opportunities in the field of occupational hygiene and occupational safety.

Admission To qualify as a regular student, applicants must have as a minimum, the equivalent of a 3.00 GPA. Applicants with a minimum 2.50 GPA (or the equivalent) may be admitted on a provisional basis. Foreign students must demonstrate proficiency in communicating in English (550 or more in TOEFL).

Students must comply with the rules and regulations as outlined in this catalog for graduate work in the College of Engineering and Mineral Resources. Each master's candidate prepares a planned program of study that contains a minimum of 30 semester credit hours, including a thesis of six hours of research credit; or 36 credit hours, including a problem report of not more than three hours of research credit.

Required Courses Required courses for the M.S.I.E. and the M.S.E. are determined by the student's area of emphasis (i.e., decision sciences, manufacturing systems, or applied ergonomics). The M.S. in occupational hygiene and occupational safety course requirements are listed under those areas.

Thesis The thesis or problem report must conform to the general requirements of the University and to written requirements of the Department of Industrial and Management Systems Engineering.

Oral Examination A candidate will be required to pass an oral examination on course work and the thesis or problem report.

Doctor of Philosophy

A candidate for the degree of doctor of philosophy (Ph.D.) must comply with the rules and regulations of the College of Engineering and Mineral Resources and the University. To be accepted in the Ph.D. program, applicants should have as a minimum the equivalent of a 3.40 GPA in their graduate work. They must also meet all the entrance requirements stated earlier for the master programs. Each student will develop a program with a major in industrial engineering, designed to meet his/her needs and objectives in consultation with the an advisor and the advisory and examining committee. Required core courses for the Ph.D. program are determined by the student's area of emphasis. In general, Ph.D. students take approximately 54 hours of course work beyond their baccalaureate degree, with a minimum of 30 hours in industrial engineering. The research work for the doctoral dissertation may entail a fundamental investigation or a broad and comprehensive investigation into an area of specialization.

Early in the doctoral program, the student must pass an examination to demonstrate master's-level proficiency in industrial engineering subject matter. Upon completion of the course work, the student must pass a written examination in order to be admitted to candidacy. An acceptable dissertation must be written and defended.

Degree Program in Occupational Hygiene and Occupational Safety

The three disciplines that form the basis of occupational hygiene and occupational safety are industrial hygiene, industrial safety, and ergonomics. The program blends essential information from these underlying disciplines to provide master's level students with the broad background necessary to be effective in today's complex occupational hygiene and occupational safety environment while still giving students the opportunity to emphasize one area. This masters level program is accredited in industrial hygiene by the Related Accreditation Committee of the Accreditation Board of Engineering and Technology (ABET).

Occupational hygiene and occupational safety looks to no specific discipline for problem solution. Rather, it integrates the content of a broad variety of scientific and technical areas to produce technically sound and economically feasible solutions to safety and health problems in the workplace. Thus, no specific undergraduate degree is required for admission to the program. Instead, a minimum of 60 credit hours of approved science, mathematics, and other technical courses are required. Of these, at least 15 must be junior or senior level. Admission preference is given to students with degrees in engineering, physical science, or mathematics. A grade-point average of at least 3.0 is required in previous course work. GRE scores will be considered in the admission decision.

Pre or Corequisite Courses

The following are considered pre or corequisite courses: one semester of statistics, two semesters of chemistry, two semesters of physics, and one semester of computer programming. On an individual basis, the faculty may identify additional pre or corequisite course work. Applicants will be advised about their specific requirements at the time of admission. Applicants not meeting all of the listed requirements may be considered for admission as provisional students.

The degree requirements include completion of a minimum of 36 credit hours, a final grade-point average of at least 3.0, and completion of a three-hour problem report or a six-hour thesis. The typical plan of study is as follows:

Fall

IMSE 260 *Human Factors Engineering*
IMSE 261 *System Safety Engineering I*
IMSE 361 *Industrial Hygiene Engineering*
OHOS 321 *Epidemiology*
Environmental Elective
Occupational Hygiene and Occupational Safety Seminar

Spring

IMSE 364 *Industrial Ergonomics*
OHOS 325 *IH Sampling and Analysis*
PCOL 362 *Occupational Toxicology*
IMSE 480 *Fire Protection Engineering*
OHS/Occupational Medicine elective

Summer

OHOS 326 *Safety and Health Measurement and Instrumentation*
OHOS 328 *Noise and Ventilation Control Technology*

Typical Electives

CE 245, 251, 290, 349, 350, 480
IMSE 214, 314, 325, 340, 360, 362, 368
MAE 28 *Engineering Acoustics*
MAE 330 *Instrumentation Engineering*

CHE 260 *Chemical Process Safety*
MANG 216 *Personnel Management*
STAT 312 *Statistical Methods 2*
CCMD 350 *Radiation Safety in Isotope Usage*
CMED 491 *Advanced Study*

Electives should be selected to enhance a student's overall professional and technical capability based on the his/her interests and background. They must be approved by the student's faculty advisor. Generally, electives will come from environmental engineering, safety engineering, industrial hygiene, or occupational medicine.

Industrial and Management Systems Engineering (IMSE)

201. *Principles of Solidification*. 3 HR. PR: IMSE 200 or consent. Material and energy balances, solidification of metals, riser and gating systems for castings, fluidity of metal, casting design, and molding processes.

202. *Manufacturing Processes*. 2 HR. PR: CHE 105 and MAE 43. Lectures and demonstrations relating to materials, properties, parameters, design, equipment, economics and computer control of processing systems emphasizing castings, machining, joining, and forming operations.

203. *Manufacturing Processes Laboratory*. 1 HR. Coreq.: IMSE 202. Laboratory experiments and demonstrations of the basic manufacturing operations of casting, machining and joining. Process parameter measurement, inspection techniques and CNC programming are performed and laboratory report writing is emphasized.

205. *Design for Manufacturability*. 2 HR. PR: IMSE 202 and IMSE 203. Aspects of design, manufacturing and materials; emphasis on design for manufacturability and assembly, including material selection and manufacturing processes on product cost. 2 HR. lec.

206. *Design for Manufacturability Laboratory*. 1 HR. PR: IMSE 202 and IMSE 203. Laboratory tasks dealing with manufacturing and materials; process selection, and cost estimation for component and subassembly design; emphasis on utilizing design for manufacturability and assembly software. 1 HR. lab.

211. *Expert Systems in Manufacturing*. 3 HR. PR: IMSE 202 and IMSE 203 and IMSE 281. Expert systems design and development for manufacturing applications; knowledge acquisition, representation, search techniques, inference engines, data base intrafaces, algorithmic interfaces.

214. *Advanced Analysis of Engineering Data*. 3 HR. PR: IMSE 113. Introduction to linear statistical models. Design and analysis of simpler experimental configurations occurring frequently in engineering studies. Similarities and differences between regression and experiment design models emphasized in a vector-matrix setting.

215. *Statistical Decision Making*. 3 HR. PR or Conc.: IMSE 113. Basic concepts of probability theory. Discrete and continuous distributions, joint and derived distributions, with application to industrial and research problems. Introduction to generating functions and Markov chains.

216. *Industrial Quality Control*. 3 HR. PR: IMSE 113. Principles and methods for controlling the quality of manufactured products, with emphasis on both economic and statistical aspects of product acceptance and process control.

217. *Total Quality Management*. 3 HR. PR: IMSE 113. Fundamentals and philosophy of total quality management in industry and government. Includes implementation of quality function deployment and the tools of off-line quality assurance procedures.

222. *Job Evaluation and Wage Incentives*. 3 HR. PR: IMSE 140 or consent. Principles used in evaluating jobs, rates of pay, characteristics and objectives of wage incentive plans, incentive formula and curves.

240. *Labor and Productivity*. 3 HR. PR: Consent. The work force as a critical element of productivity. Topics include industrial engineering involvement in collective bargaining, labor relations, and work practices.

242. *Production Planning and Control*. 3 HR. PR: IMSE 140; Conc.: IMSE 214. Principles and problems in forecasting, aggregate planning, material management, scheduling, routing, and line balancing.

243. *Facility Planning and Design*. 3 HR. PR: IMSE 242 and IMSE 250. Problems of facility and equipment location. Long-range planning of industrial facilities. Block and detailed layout of manufacturing plants and general offices. Space utilization and allied topics in facility design.

249. *Design of Dynamic Materials Systems*. 3 HR. PR: IMSE 140 or consent. Application of industrial engineering theory and practice to selection of material systems and equipment including efficient handling of materials from first movement of raw materials to final movement of finished product. Present quantitative design techniques.

250. *Introduction to Operations Research*. 3 HR. PR: IMSE 113 and IMSE 281. Basic tools and philosophies of operations research. Tools include: linear programming, Markov chains, queuing theory, and simulation. Other operations research techniques are presented as they relate to the overall systems philosophy.

251. *Analytical Techniques of Operations Research*. 3 HR. PR: IMSE 113 or consent. Nonlinear optimization techniques useful in operations research and industrial engineering studies. Classical optimization techniques, quadratic, geometric and dynamic programming, branch and bound and gradient techniques.

260. *Human Factors Engineering*. 3 HR. PR: IMSE 113 and IMSE 140 or equiv. Includes the study of ambient environment, human capabilities and equipment design. Systems design for the human-machine environment interfaces will be studied with emphasis on health, safety, and productivity.

261. *System Safety Engineering*. 3 HR. PR: Consent. The concepts of hazard recognition, evaluation analysis and the application of engineering design principles to the control of industrial hazards.

277. *Engineering Economy*. 3 HR. Basic concepts of financial analysis investment planning and cost controls as they apply to management technology investment in manufacturing; financial planning and budgeting as applied to an engineering function.

280. *Industrial Engineering Problems*. 1-3 HR. PR: Consent. Special problems.

281. *Computer Applications in Industrial Engineering*. 3 HR. PR: ENGR 2 and IMSE 140. Introduction to computer applications in manufacturing. Emphasis on system design and analysis and the role of computers in productivity improvement.

284. *Simulation by Digital Methods*. 3 HR. PR: (IMSE 113 and IMSE 281) or consent. Introduction to Monte Carlo simulation methods and their application to decision problems. Student identifies constraints on problems, collects data for modeling and develops computer programs to simulate and analyze practical situations. Interpretation of results emphasized.

291. *Design of Productive Systems 1*. 3 HR. PR: Senior standing (21 hours of required IMSE courses) in industrial engineering. The integration of industrial engineering principles in the design of productive systems. Emphasis will be on analysis of different systems for productivity management.

292. *Design of Productive Systems 2*. 3 HR. PR: Senior standing in industrial engineering. Continuation of IMSE 291.

300. *Special Topics in Manufacturing Processes and Automation*. 3 HR. PR: IMSE 200 or equivalent. Special topics concerning manufacturing processes and automation with special emphasis on manufacturing management.

302. *Advanced Manufacturing Processes*. 3 HR. PR: IMSE 202 and IMSE 203. Metal cutting economic models, solidification processes, bulk deformation, sheet metal and drawing, joining design and economics. Overall view of manufacturing systems. Introduction to numerical control programming and projects on numerical control equipment.

303. *Reliability/Maintainability*. 3 HR.

304. *Materials and Processing Systems Design*. 3 HR. PR: IMSE 202 and IMSE 203. The engineering design process, material design properties and selection systems, decision making, and problem analysis techniques for materials and processing. Economic and cost systems, expert systems, failure analysis and quality systems for materials and process selection.

305. *Computer Integrated Manufacturing*. 3 HR. PR: Graduate standing. Several aspects of computerized manufacturing systems will be covered. Emphasis will be placed on computer fundamentals, computer aided design and manufacturing, numerically controlled (NC) machine tools, part programming, system devices, and direct digital control. 2 HR. lec., 1 HR. lab.
307. *Robotics and Flexible Automation*. 3 HR. PR: Graduate standing. This course will provide an understanding of the principles, capabilities and limitations of industrial robots, and other flexible automation tools. Emphasis will be placed on kinematic analysis, trajectory planning, machine vision, and manufacturing automation. 2 HR. lec., 1 HR. lab.
308. *Advanced Problems in Manufacturing Engineering*. 1-3 HR. PR: IMSE 300 or IMSE 302; graduate standing. Special problems relating to one of the areas of manufacturing engineering, such as manufacturing processes, robotics, CAD/CAM, group technology, and manufacturing systems engineering.
309. *Computational Methods for Manufacturing Engineers*. II. 3 HR. PR: Graduate standing. Computational techniques applicable to manufacturing systems engineering problems; emphasis on use of personal computers. 2 HR. lec., 1 HR. lab.
313. *Statistical Mthd Engineering*. 3 HR.
314. *Design of Industrial Experiments*. 3 HR. PR: IMSE 214 or consent. Continuation of IMSE 214. More complex experimental design especially useful to engineering and industrial researchers, including factorials and optimum-seeking design. Emphasis on use of existing digital computer routines and interpretation of results.
325. *Engineering Management*. 3 HR. Unique problems of engineering organizations including project planning, managing creativity, coordinating design and development, and other topics relevant to engineering organizations.
338. *Technology Forecasting*. 3 HR. Various procedures used in forecasting technical developments.
340. *Work Analysis*. 3 HR. PR: Consent. Analysis of industrial engineering's involvement in analyzing work situations. Particular emphasis will be given to the use of industrial engineering as a change agent in improving work practices.
342. *Advanced Production Control*. 3 HR. PR: IMSE 250. Different mathematical models useful in the design of effective production control systems. The various models include: static production control models under risk and uncertainty; dynamic models under certainty, under uncertainty, and under risk.
351. *Quality & Reliability Engineering*. II. (Alternate years) 3 HR. PR: Graduate standing. Introduction to quality and reliability engineering. Special emphasis on Taguchi Design and Markov Models for determining system reliability and availability.
353. *Applied Linear Programming*. 3 HR. PR: IMSE 250 or consent. Application of the assignment, transportation, and simplex algorithms to typical industrial problems. The methods and computational efficiencies of the revised simplex and other algorithms are also studied.
355. *Scheduling and Sequencing Methods*. 3 HR. PR: IMSE 250. Theory and applications of analytical models used in the scheduling models; flow shop models; job shop models; and assembly line balancing methods.
358. *Special Topics in Systems Analysis and Operations Research*. 3 HR. PR: Consent. Special topics from recent developments in operations research and related fields. Special emphasis will be placed on interests of current graduate students.
359. *Operations Research for Public Administrators*. 3 HR. Examination of role of quantitative analysis in public administration and decision-making.
360. *Human Factors System Design*. 3 HR. PR: IMSE 260 or consent. Theoretical aspects and practical applications of man/machine relationships as they influence future system design. The student will examine human limitations with respect to acceptance of information, decision making, and ability to transmit the result of such decisions to controlled equipment systems to obtain design optimization. 2 HR. lec., 3 HR. lab.

361. *Industrial Hygiene Engineering*. 3 HR. Introductory course in industrial hygiene legal standards, historical context, and development. Topics include respiratory physiology, particle size and deposition, ionizing and nonionizing radiation, physical stress, solvents, metals, pesticides, painting, welding, and degreasing.

362. *Systems Safety Engineering*. 3 HR. PR: IMSE 261 or consent. Analysis of manufacturing methods, processes, and properties of materials from a system safety engineering viewpoint. Emphasis will be on hazard analysis techniques (fault tree, MORT, failure modes and effects) and machine guarding methods.

364. *Industrial Ergonomics*. 3 HR. PR: IMSE 260 or consent. Practical experience in the application of ergonomic principles to industrial problems. Safety and production implications of work physiology, industrial biomechanics, and circadian rhythms, as well as current interest topics.

368. *Advanced Problems in Human Factors*. 1-3 HR. PR: IMSE 260 or IMSE 360 and graduate standing. Special problems relating to one of the areas of human factors, such as imitation, controls, vigilance, safety, and occupational health.

377. *Advanced Engineering Economy*. 3 HR. PR: Consent. Special emphasis on depreciation, engineering and economic aspects of selection and replacement of equipment; relationship of technical economy to income taxation; effect of borrowed capital and pricing model.

378. *Costing and Estimating for Manufacturing*. I. 3 HR. PR: IMSE 277 or consent. Analysis of overhead, cost indexes, cost capacity factors, improvement curves; costing for materials with design considerations; conceptual cost estimating; costing for machining, joining, casting and forming; facility cost estimation.

381. *Integrated Data Processing*. 3 HR. PR: IMSE 281 and consent. Advanced work in electronic data-processing systems and procedures design. Case studies of integrated data-processing systems. Course projects will include individual use of computer in management data-processing analysis problems.

387. *Materials Engineering*. 3 HR. A study of material engineering fundamentals emphasizing semiconductor, polymer, metal, and ceramic/cementitious material systems. Mechanical and physical properties, theoretical aspects, testing, design criteria, manufacturing, and economics of material systems. Laboratory testing and evaluation. (Equivalent to CE 387, CH E 387, EE 387, EM 387, and MAE 387.)

391. *Advanced Topics*. 1-6 HR.

397. *Research*. 1-15 HR.

451. *Nonlinear Programming*. 3 HR. PR: IMSE 250 or consent. Advanced study of the techniques of nonlinear programming and their applications. Topics include steepest descent, Newton's method, Fletcher-Powell, conjugate gradients, Powell's method, and penalty function methods.

452. *Queueing Theory*. 3 HR. PR: IMSE 113 and IMSE 250 or consent. Analytical modeling of waiting line systems with emphasis on determining the best operating conditions for those systems. Single-channel and multichannel models. Computational methods (including Monte Carlo techniques) are examined. Applications to problems such as maintenance and inventory control.

453. *Theory of Linear Programming*. 3 HR. PR: IMSE 250 or consent. Study of procedures available for solving large-scale problems using linear programming. Topics include decomposition techniques, multiple pricing, cycling, inverse generation and storage, ranging procedures, and upper bound algorithms.

454. *Inventory Theory*. 3 HR. PR: IMSE 113 and IMSE 250 or consent. Techniques used in optimization of inventory systems. Elements of static, deterministic inventory models, and static, stochastic inventory models. Selected inventory models. Selected topics related to inventory analysis.

455. *Probability Theory for Engineers*. 3 HR. PR: IMSE 113 or consent. Probability theory and its application to industrial systems with particular emphasis on inventory, queueing, maintenance, reliability, and quality control systems. Markov processes are covered.

456. *Applied Stochastic Processes*. 3 HR. PR: IMSE 455. Stochastic systems with emphasis on application to inventory and queueing theory. Conditional probability, Poisson processes, renewal processes, Markov chains with discrete and continuous parameters.

457. *Dynamic Programming*. 3 HR. PR: IMSE 250 or consent. Introduction to basic structure and computational aspects of dynamic programming and applications including sequential decision problems, deterministic and probabilistic models over finite and infinite planning horizons, and Markovian decision processes.

458. *Integer Programming and Applied Networks*. 3 HR. PR: IMSE 250 or consent. Introduction to application of integer programming and maximum flow networks to engineering and operations research problems. Emphasis on problem formulation and solution.

480. *Seminar*. 1-6 HR. PR: Consent. Discussion of research in industrial engineering and special problems.

484. *Advanced Digital Simulation*. 3 HR. PR: IMSE 284 or consent. Analysis and comparison of special purpose digital simulation languages such as GPSS, SLAM, SIMAN, SIMSCRIPT, CSMP, DYNAMO, and JOB SHOP simulation.

497. *Research*. 1-15 HR.

Occupational Hygiene and Occupational Safety (OHOS)

320. *Foundations of Environmental Health Practice*. I, II, S. 4 HR. PR: Consent. Designed to enable the environmentalist to recognize and identify environmental stresses and the effect of these stresses on man. Topics include occupational health, physical stress, safety, and basic and broad principles of toxicology.

321. *Epidemiology: Principles and Practices*. I, II, S. 2 HR. PR: STAT 311 or equivalent. Principles and methods of epidemiology with emphasis on descriptive and analytical epidemiological methods.

325. *Industrial Hygiene Sampling and Analysis*. II. 4 HR. PR: IMSE 361 and consent. Calibration and use of sampling and analytical equipment used by industrial hygienists to evaluate the work environment. Advantages and disadvantages of different equipment under various conditions. Biological monitoring as an evaluation tool.

327. *I. H. Noise Assessment*. S. 3 HR. PR: IMSE 361. Industrial Hygiene aspects of assessing and controlling noise induced hearing loss. Practical experience with noise dosimeters, sound level meters and instrumentation used to assess human noise exposure is provided by field trips and case studies.

328. *Noise and Ventilation Control Technology*. S. 3 HR. PR: IMSE 361 or consent. The course will demonstrate techniques for the recognition, evaluation, and control of noise and ventilation problems. Students will use monitoring equipment to evaluate situations and perform several design projects.

380. *Internship*. I, II, S. 3-6 HR. (May be repeated.) PR: Consent of committee chairperson and department chairperson. Professional internship providing on-the-job training under supervision of a previously approved environmentalist in settings appropriate to professional objectives.

490. *Teaching Practicum*. 1-3 HR.

491. *Advanced Study*. I, II, S. 1-6 HR. PR: Consent. Investigation in advanced subjects which are not covered in regularly scheduled courses. Study may be independent or through specially scheduled lectures.

497. *Research*. I, II, S. 1-15 HR.

Mechanical and Aerospace Engineering

Donald W. Lyons, Ph.D., P.E., Chairperson

323 Engineering Sciences Building

e-mail: mae-info@cemr.wvu.edu

web: <http://www.cemr.wvu.edu/~wwwmae>

Degrees Offered:

Master of Science in Mechanical Engineering

Master of Science in Aerospace Engineering

Master of Science in Engineering with a major in Mechanical or Aerospace Engineering

Doctor of Philosophy in Engineering with a major in Mechanical or Aerospace Engineering

Faculty

Faculty members in the department have extensive industrial and teaching experience and have published widely. Their combined experience helps them assist students in selecting relevant courses and research topics to meet their educational goals. The department has extensive laboratory space in the Engineering Sciences Building and in the Engineering Research Building to provide support for both instructional and research activities. The department has several special laboratories located nearby, which include the engine research center, the wind tunnel laboratory, and the aircraft-flight test hangar at the Morgantown Municipal Airport (Hart Field). Funded research allows the department to maintain up-to-date instrumentation, equipment, and facilities, including computer-controlled data acquisition systems for laboratory use.

Graduate Programs

The objectives of the departmental graduate-level programs are: (1) to provide master's level education for students in or entering the engineering profession and/or (2) to provide an advanced graduate educational experience for students pursuing the doctoral degree. Three master's degrees are offered in the department: the master of science in aerospace engineering (M.S.A.E.), the master of science in mechanical engineering (M.S.M.E.), and the master of science in engineering (M.S.E.) with a major in mechanical engineering or with a major in aerospace engineering. The department also offers the doctor of philosophy (Ph.D.) degree with majors in mechanical engineering and aerospace engineering.

An application package can be obtained from the graduate program director, Department of Mechanical and Aerospace Engineering, West Virginia University, P.O. Box 6106, Morgantown, WV 26506-6106.

Admission to Master's Programs

To be eligible for admission into the M.S.A.E. or M.S.M.E. degree program, a candidate must hold or expect to receive (by the enrollment date) a B.S.A.E. or B.S.M.E. degree from either an accredited ABET curriculum or an internationally recognized program. Candidates with superior academic records in baccalaureate degrees in other engineering fields, mathematics, or science may be eligible for admission into any of the master's programs offered by the department but will normally be required to attain a baccalaureate level of proficiency in certain engineering areas of the department. An engineering technology (non-calculus based) degree is not sufficient qualification for admission into any of the graduate programs offered by the department.

Doctor of Philosophy Program Admission

To be eligible for admission into the doctor of philosophy degree program, a candidate must hold or expect to receive (by the enrollment date) an B.S. degree in some

discipline of engineering from an institution which has an ABET accredited undergraduate program in engineering or an internationally recognized program in engineering.

General Admission Requirements

The other requirements for admission into the graduate programs of the department are summarized as follows:

- To be admitted as a regular graduate student, an applicant must have a grade-point average of 3.0 or better (out of a possible 4.0) in all previous college work and must meet all other requirements below.
- The applicant must first submit, to the office of admissions and records of West Virginia University, a completed application, application fee, and transcripts of all college work (directly from the institution) completed.
- Each applicant is required to have three reference letters (using standard forms available from the department) sent directly to the department; at least two of the three references should be from the institution last attended.
- A minimum score of 550 on the TOEFL is required of all applicants from countries where the native language is not English. (This requirement will be waived for applicants who have completed a recent four-year bachelor's degree in the USA.)
- All international applicants who have not received their undergraduate degree in the USA are required to submit GRE general test scores with the engineering subject test score being optional. Minimum levels of 75th percentile (score of 670) on the quantitative part of the test and 60th percentile (score of 560) on the analytical part are required.

Provisional Admission

An applicant not qualifying for the regular graduate student admission status, either due to insufficient grade-point average, incomplete credentials, or inadequate academic background, can be admitted as a provisional student. Requirements for attaining regular student status must be stated in a letter of admission. Provisional students must sign a contract, which lists in detail all requirements to be met for attaining regular student status, no later than their first registration.

All of the degree programs require the student to attain an overall grade-point average of 3.0 or higher in order to meet graduation requirements. The grade-point average is calculated on the basis of courses and excludes credit for research, for which a grade of S is received. A maximum of nine credit hours of the course work can be at the advanced (200) undergraduate-level, dependent upon the program desired by the student and the agreement of his/her advisory and examining committee.

Courses

Only courses with grades of C or higher may be acceptable for graduate credit, although all course work taken will be counted in establishing the student's grade-point average. No more than nine hours of 200-level credit can be counted toward meeting the course work requirements for the M.S. degree. For the Ph. D., even though the absolute minimum set by the College is 18 hours of course work at the 300-level or higher taken at WVU, the actual minimum is set by the student's advisory and examining committee and is based on the student's background and the area of dissertation. No more than 20 percent of the course work for a doctoral degree can be at the 200 level. A minimum of 24 semester hours of research credit at the Ph.D. level is required for dissertation requirements. Two semesters of full-time attendance at the WVU Morgantown campus are necessary to meet residency requirements in the Ph.D. program.

Math Requirements

The Department of Mechanical and Aerospace Engineering requires that the graduate course work include six hours of advanced mathematics for M.S. programs of study

and a minimum of six additional hours of mathematics for the Ph.D. programs. A list of approved mathematics courses can be obtained from the graduate program director of the department.

Time Limitations

All requirements for a master's degree must be completed within eight years preceding the student's graduation. Students should petition for admission to candidacy for the degree during the first semester of residency by filing a plan of study approved by his/her advisory and examining committee. A minimum of 30 hours of course work (including research) is required for the degree. Students must pass a final examination administered by their advisory and examining committee before being certified for the degree.

Doctor of Philosophy

The doctorate is a research or performance degree and does not depend on the accumulation of credit hours. The requirements for the degree are: passing of the qualifying examination, admission to candidacy, residency, completion of dissertation research, and defense of a research dissertation. At least one member of the graduate faculty from outside the department is required to serve on the advisory and examining committee.

The Ph.D. degree signifies that the holder has the competence to function independently at the highest level in the chosen field. Hence, the number of years involved in attaining or retaining competency cannot be readily specified, nor can an exact program of study be defined. The course work taken should be sufficient to broaden the student's background in at least one other area of the department in addition to the major area of study.

Qualifying Exam The Ph.D. qualifying/candidacy examination is the method of assessing whether the student has attained sufficient knowledge of the discipline and supporting fields in order to undertake independent research or practice. Students are required to pass a qualifying examination administered by the department which tests for a minimum level of proficiency expected of all students in a given area. It is expected that students will take the qualifying exam during their first semester of enrollment in the Ph.D. program; however it is required that full-time students pass the qualifying examination no later than the end of the second semester of their Ph.D. program. As the student progresses, his/her advisory and examining committee is charged with evaluating the student's competency in the specific area of study through the evaluation of a dissertation proposal for the research to be completed and the evaluation of the student's plan of study and associated course work. After these requirements are completed, the student is formally admitted to candidacy for the Ph.D. degree. Only at this point can a student be called a doctoral candidate; admission to the graduate program for the purpose of pursuing the Ph.D. is not equivalent to becoming a Ph.D. candidate. Doctoral candidates are allowed no more than five years to complete the remaining degree requirements after admission to candidacy. An extension of time can be obtained only by repeating the qualifying examination and meeting any other requirements specified by the student's committee.

M.S.A.E. Degree

Students wishing to pursue a program leading to an M.S.A.E. degree are required to have a B.S.A.E. or B.S.M.E. from an accredited ABET curriculum or the equivalent. Students with an engineering background other than aerospace or mechanical engineering normally will be required to strengthen their background. Programs of study must comply with the rules and regulations as outlined in the general requirements for graduate work in the College of Engineering and Mineral Resources. The student's program of study is formulated jointly by the student and his/her committee. Normally, a thesis is required of all candidates for the degree of master of science in aerospace engineering.

Course Requirements The plans of study for the M.S.A.E. degree must include six semester hours of advanced mathematics beyond a first course in differential equations and at least 12 semester hours of courses taken from any two areas of the department. The remainder of the course work may consist of other courses from mechanical and aerospace engineering, other departments in the College of Engineering and Mineral Resources, or advanced course work in mathematics, chemistry, and physics. A maximum of six hours of research credit is counted toward degree requirements for thesis work. Students not completing a thesis will be required to include six hours of methods courses in their plans of study.

M.S.M.E. Degree

Students wishing to pursue a program leading to an M.S.M.E. degree are required to have a B.S.M.E. or B.S.A.E. from an accredited ABET curriculum or its equivalent. Students with an engineering background other than mechanical or aerospace engineering normally will be required to strengthen their background.

The plan of study must include at least six hours of advanced mathematics beyond a first course in differential equations, and 12 total hours of courses from at least two areas of study in mechanical engineering. Students are normally required to write a thesis. On occasion, part-time off-campus students may be given permission to substitute a problem report for a thesis when they can present compelling evidence of equivalent experience. A maximum of six hours of research credit is counted toward meeting degree requirements for the thesis option; a maximum of three hours of research credit is counted for the problem report option. The student's plan of study is formulated jointly with his/her advisory committee based upon the interests and educational goals of the student. Students not completing a thesis will be required to include six hours of methods courses in their programs of study.

M.S.E. Degree

The M.S.E. programs with a major in mechanical engineering or in aerospace engineering are intended for students who wish to pursue graduate work in these areas but do not have an undergraduate degree in either discipline. Students desiring to pursue such a program in the department must meet similar general requirements as for the M.S.A.E. and M.S.M.E. degree programs.

Plan of Study Each plan of study in the M.S.E. program must include six hours of advanced mathematics and nine hours from each of any two academic areas in the department. Students are normally required to write a thesis. On occasion, part-time on-campus students may be given permission to substitute a problem report for a thesis when they can present compelling evidence of equivalent experience. A maximum of six hours of research credit is counted toward meeting degree requirements for the thesis option; a maximum of three hours of research credit is counted for the problem report option. The student's plan of study is formulated jointly with his/her advisory committee based upon the interests and educational goals of the student. Students not completing a thesis will be required to include six hours of methods courses in their plans of study.

Ph.D.

Students intending to pursue a doctoral program in the College of Engineering and Mineral Resources with an emphasis in mechanical or aerospace engineering should have earned a B.S. and an M.S. degree in some discipline of engineering. While it is possible for a student with a B.S. degree to enroll directly in the Ph.D. program, it is very rarely permitted.

The doctoral courses of study are selected to fit the individual interests and objectives of the student, with proper attention given to broadening related areas of study. The research work for the doctoral dissertation may entail a fundamental investigation into a specialized area or a broad and comprehensive program of study.

Academic Areas

Courses in the department are organized under four academic areas: aerodynamics and fluids engineering; solid mechanics, materials and structures; system control and manufacturing and design; and thermal sciences and engineering. Students who are pursuing an advanced degree in either mechanical or aerospace engineering may work in one of these areas. In addition, students may pursue studies leading to a specialization in bioengineering.

Aerodynamics and Fluids

A variety of courses and facilities support graduate research in aerodynamics and fluid mechanics. Laboratories are located in college buildings and remote sites. Flow facilities include instrumented subsonic and supersonic wind tunnels, shock tubes, and several flow loops mainly used for research in gas-solid and density stratified flows. Available instrumentation includes eight channels of hot wire/film anemometry, two single-component and one three-component, laser Doppler velocimeter (LDV) systems. The department owns well-instrumented V/STOL and Cessna U-206 flight test aircraft housed in hangar facilities at Hart Field. A significant portion of the current activity involves numerical solutions to flow problems and is supported by a computing facility dedicated to graduate research.

Although the faculty background and interests in the areas of aerodynamics and fluid mechanics are broad, recent research has been concentrated on problems in multiphase and density-stratified flows, low-speed aerodynamics, shock phenomena in two-phase systems, flow in microgravity, boundary layer control, and high-speed aerodynamics. These research areas include topics such as fluidized bed combustion, aerosol sampling, flow metering, flow distribution systems, numerical solutions to gas-solid flows, and fluid-particle turbulence interactions, including deposition on solid surfaces. The low-speed aerodynamics work is related to the design of vertical axis wind turbines and STOL airfoils. The research in high-speed aerodynamics deals with viscous-inviscid interactions in transonic, supersonic, and hypersonic flow.

Solid Mechanics, Materials, and Structures

The solid mechanics, materials, and structures (SMMS) area encompasses the theoretical, numerical, and experimental study of solid bodies, from concentration on local behavior of deformable bodies to the global response of structural elements or the motion of rigid bodies. Hence, SMMS students may explore the mechanical behavior of materials in the neighborhood of micro-scale defects such as cracks or investigate the behavior of large-scale bodies such as aerospace structures.

The SMMS faculty carries out basic and applied research related to problems in engineering using state-of-the-art computational and experimental techniques. The areas of research include aeroelasticity, fracture mechanics, nonlinear dynamics and vibrations, composite materials, biomechanics, computational methods such as finite-element and boundary-element, and experimental techniques, including optical methods. Furthermore, in cooperation with the Department of Civil and Environmental Engineering, SMMS students may pursue studies related to civil engineering. A large array of research facilities includes laboratories (materials, structures, vibrations, photomechanics, biomechanics, fracture mechanics, and computer aided engineering), computers (IBM and VAX mainframes, work stations, personal computers, and supercomputers), and shop facilities.

Required Core Courses

Regardless of the chosen specialty, the SMMS student is required to take six hours of courses from a core group consisting of MAE 311, MAE 320, and an introductory FEM course. This requirement may be waived for students who can demonstrate that they possess equivalent knowledge. These courses, combined with the entire plan of study, including research credits, prepares the SMMS student to apply mechanics to modern engineering challenges.

System Control, Design, and Manufacturing

The system control, design, and manufacturing academic area offers instructional and research opportunities for students who want to challenge themselves to attain the expertise required to design or control the behavior of a system in a dynamic environment. Instructional offerings furnish students with a foundation for developing prototype systems and for improving the performance of existing systems. These offerings provide such emphasis as elastodynamic analysis, computerized design, active control in automated machines, and manufacturing systems engineering.

The research endeavors of its faculty reflect a close association with current industrial-type situations. Faculty have research ongoing in the areas of engine acoustic impedance modeling, the control of energy systems in buildings, concurrent engineering, robotics, artificial intelligence, CAD, process control, microprocessor applications, and computer-aided manufacturing.

Thermal Sciences

The thermal sciences and engineering area encompasses the fields of thermodynamics, combustion, heat transfer, and power and energy systems. Graduate course offerings cover a wide range of topics in this area with applications to both aerospace and mechanical engineering problems. Recent research efforts include topics such as the analysis of fluidized bed combustion, energy analysis of buildings, oscillating jet combustion, alternative fuels testing, internal combustion engine performance and emissions, heat transfer, numerical analysis of thermal systems, deposition on turbine blades, and reactor design.

Research facilities include a high-altitude simulation chamber for ablation and wear studies, a fluidized bed combustion laboratory, thermal analyzers, an electrically-heated, natural convection water facility, Schlieren systems for flows with varying density, recording thermocouple data-acquisition systems, a water reservoir for thermal stratification studies, an engine research laboratory, and an emissions research laboratory.

Bioengineering

The MAE Department, in conjunction with other departments in the College of Engineering and Mineral Resources and the Health Sciences Center, offers a program in bioengineering culminating in master's and Ph.D. degrees. The plan of study for a master's degree requires a minimum of 30 credit hours. This includes at least six hours of bioengineering or medical courses. Students are encouraged to continue toward a Ph.D. by following a plan of study tailored specifically to their research interests. Students whose B.S. degrees are in disciplines other than engineering may be required to complete prerequisite courses.

Areas of research specialization include respiratory and diseased tissue mechanics, orthopedic mechanics, bone growth and fracture, and the application to rehabilitation of computer-aided design and microprocessor-based instrumentation. Research facilities include an aerosol inhalation exposure system, laser-based holographic and moiré interferometric equipment, a lung acoustic impedance measurement system, and modern orthopedic, rehabilitation, and computer research laboratories.

Mechanical and Aerospace Engineering (MAE)

200. *Advanced Mechanics of Materials 1*. 3 HR. PR: MAE 43 or consent. Advanced topics in applied stress analysis; stress concentrations, strain energy, beams, thick-walled cylinders, torsional warping, fracture. 3 HR. lec.

210. *Kinematics*. 3 HR. PR: MAE 113 and MATH 18 or consent. Geometry of constrained motion, kinematics synthesis and design, special linkage. Coupler curves, inflection circle, Euler-Savary equation, cubic of stationary curvature and finite displacement techniques. 3 HR. lec.

215. *Experimental Fluid Dynamics 2*. 3 HR. PR: MAE 115. Continuation of MAE 115 with increased emphasis on dynamic measurements. Shock tube/tunnel and subsonic and supersonic measurements. Experiments include optical techniques, heat transfer to models, and viscous flow measurements. Error analysis of test data. 2 HR. lec., 3 HR. lab.

216. *Applied Aerodynamics*. 3 HR. PR: MAE 116. Chordwise and spanwise airload distribution for plain wings, wings with aerodynamic and geometric twist, wings with deflected flaps, and wings with ailerons deflected. Section induced drag characteristics. 3 HR. lec.

217. *Hypersonic Gas Dynamics*. II. 3 HR. PR: MAE 117 or consent. Hypersonic shock and expansion wave relations; hypersonic inviscid flowfields: approximate and numerical methods, blast wave theory; hypersonic boundary layers and aerodynamic heating. 3 HR. lec. (Alternate years.)

220. *Guided Missile Systems*. 3 HR. PR: MAE 117 or MAE 150. Design philosophy according to mission requirements. Preliminary configuration and design concepts. Aerodynamic effects on missiles during launch and flight. Ballistic missile trajectories. Stability determination by analog simulation. Performance determination by digital and analog simulation. Control, guidance, and propulsion systems. Operational reliability considerations. 3 HR. lec.

226. *Mechanics of Composite Materials*. 3 HR. PR: MATH 17 and MAE 43. Fundamental methods for structural analysis of fiber reinforced composites. Particularities of composite applications in design and manufacturing of structural components: performance tailoring, failure criteria, environmental effects, joining, and processing. 3 HR. lec.

232. *V/STOL Aerodynamics*. 3 HR. PR: MAE 117. Fundamental aerodynamics of V/STOL aircraft. Topics include propeller and rotor theory, helicopter performance, jet flaps, ducted fans, and propeller-wing combinations. 3 HR. lec.

240. *Problems in Thermodynamics*. 3 HR. PR: MAE 141 or consent. Thermodynamic systems with special emphasis on actual processes; problems designed to strengthen the background of the student in the application of the fundamental thermodynamic concepts. 3 HR. lec.

241. *Flight Mechanics 2*. 3 HR. PR: MAE 146. Fundamental concepts of feedback control system analysis and design. Automatic flight controls, and human pilot plus airframe considered as a closed loop system. Stability augmentation. 3 HR. lec.

242. *Flight Testing*. 3 HR. PR: MAE 146. Applied flight test techniques and instrumentation, calibration methods, determination of static performance characteristics, and introduction to stability and control testing based on flight test of Cessna Super Sky-wagon airplane. Flight test data analysis and report preparation. 1 HR. lec., 6 HR. lab.

243. *Bioengineering*. 3 HR. PR: MAE 43 and PHYS 201 or consent. Introduction to human anatomy and physiology using an engineering systems approach. Gives the engineering student a basic understanding of the human system so that the student may include it as an integral part of the design. 3 HR. lec.

244. *Introduction to Gas Dynamics*. 3 HR. PR: MAE 114 or consent. Fundamentals of gas dynamics, one-dimensional gas dynamics and wave motion, measurement, effect of viscosity and conductivity, and concepts of gas kinetics. 3 HR. lec.

249. *Space Mechanics*. 3 HR. PR: MATH 18 and MAE 42. Flight in and beyond earth's atmosphere by space vehicles. Laws of Kepler and Orbital theory. Energy requirements for satellite and interplanetary travel. Exit from entry into an atmosphere. 3 HR. lec.

254. *Applications in Heat Transfer*. 3 HR. PR: MAE 158. Application of basic heat transfer theory and digital computation techniques to problems involving heat exchangers, power plants, electronic cooling, manufacturing processes, and environmental problems. 3 HR. lec.

262. *Internal Combustion Engines*. 3 HR. PR: MAE 101 or MAE 141. Thermodynamics of the internal combustion engine; Otto cycle; Diesel cycle, gas turbine cycle, two- and four-cycle engines, fuels, carburetion and fuel injection; combustion; engine performance, supercharging. 3 HR. lec.

264. *Heating, Ventilating, and Air Conditioning*. 3 HR. PR: MAE 141 or consent. Methods and systems of heating, ventilating, and air conditioning of various types of buildings, types of controls and their application. 3 HR. lec.

265. *Aeroelasticity*. 3 HR. PR: MAE 160. Vibrating systems of single degree and multiple degrees of freedom, flutter theory and modes of vibration, torsional divergence and control reversal. 3 HR. lec.

270. *Microprocessor Applications in Mechanical Engineering*. 3 HR. PR: MAE 181. Fundamentals of programming and interfacing a microprocessor. Hands-on, hardware oriented. Assembly language and BASIC programming. RAM, EPROM, analog to digital and digital to analog converters, stepper motors, encoders, AC devices. Interfacing project required. 3 HR. lec.

275. *Computer-Aided Design: Applications*. II. 3 HR. PR: MAE 132. CAD fundamentals. User-computer interface and interactive programming for rational design. Computational tools, finite elements and modeling techniques. Interactive graphics, pre-post processor applications. Case studies: conceptual-preliminary-detail interactive design and analysis.

280. *Aerospace Problems*. 1-6 HR. PR: Upper-division and graduate standing.

282. *Engineering Acoustics*. 3 HR. PR: MATH 18 or consent. Theory of sound propagation and transmission. Important industrial noise sources and sound measurement equipment. Selection of appropriate noise criteria and control methods. Noise abatement technology. Laboratory studies and case histories.

284. *Applied Feedback Control*. 3 HR. PR: MAE 122 or consent. Application of automatic control theory. Transfer functions and block diagrams for linear physical systems. Proportional, integral, and derivative controllers. Transient and frequency response using Laplace transformation. 3 HR. lec.

285. *Thesis*. 2-6 HR. PR: Senior standing and consent.

286. *Design of Robotic Systems*. 3 HR. PR: MAE 113 or consent. Mechanical automation design associated with robotic systems, including economic justification and ethics. Geometric choices and controller specifications for programmable manipulators. Workstation strategies such as CNC and CIM for computer-based flexible manufacturing.

290. *Seminar*. 1-6 HR. PR: Junior, senior, or graduate standing, and consent.

291. *Introduction to Research*. 1-3 HR. PR: Senior standing and consent. Methods of organizing theoretical and experimental research. Formulation of problems, project planning, and research proposal preparation.

292. *Research Problems*. 2-6 HR. PR: MAE 291 or consent. Performance of the research project as proposed in MAE 291. Project results are given in written technical reports, with conclusion and recommendations.

294. *Special Topics*. 1-6 HR. PR: Junior, senior or graduate standing, and consent.

299. *Special Problems*. 1-6 HR. PR: Consent.

300. *Seminar*. Credit. Attendance required of all graduate students at scheduled seminars.

305. *Analytical Methods in Engineering*. 3 HR. PR: Consent. Index notation for determinants, matrices, and quadratic forms; linear vector spaces, linear operators including differential operators; calculus of variations, eigenvalue problems, and boundary value problems.

307. *Nonlinear Analysis in Engineering*. 3 HR. PR: Consent. Special topics in nonlinear analysis of various types of engineering systems. Various numerical approximate, and analytical techniques chosen to suit the needs and interests of advanced graduate students.

311. *Advanced Mechanics of Materials*. 3 HR. PR: Consent. Shear flow and shear center; curved beams; unsymmetric bending, energy methods in structural analysis; theories of failure; instability of structures; beams on elastic foundation.

312. *Inelastic Behavior of Engineering Materials*. 3 HR. PR: MAE 311 or consent. Characterization and constitutive relations of engineering materials; nonlinear elasticity, plasticity, viscoelasticity and creep; numerical implementation.

315. *Fluid Flow Measurements*. 3 HR. PR: MAE 117 or consent. Principles and measurements of static and dynamic pressures and temperatures, velocity, and Mach number and forces. Optical techniques and photography. Design of experiments. Review of selected papers from the literature. 2 HR. lec., 3 HR. lab.

316. *Energy Methods in Applied Mechanics*. 3 HR. PR: Consent. Variational principles of mechanics and applications to engineering problems; principles of virtual displacements, minimum potential energy, and complementary energy, Castigliano's theorem, Hamilton's principle. Applications to theory of plates, shells, and stability.

318. *Continuum Mechanics*. 3 HR. PR: MAE 42 and MAE 43. Mathematical preliminaries including index notation; analysis of stress; analysis of deformation; fundamental laws, field equations, and constitutive equations; application to fluids and solids.

320. *Theory of Elasticity 1*. 3 HR. PR: MAE 132 or consent Cartesian tensors; plane stress and plane strain; 2-D problems in Cartesian and polar coordinates; stress and strain in 3-D; general theorems; torsion of noncircular sections.

321. *Fracture Mechanics*. II. 3 HR. PR: MAE 320. Linear-elastic and elastic-plastic fracture mechanics; fatigue, dynamic, and creep crack growth; fracture mechanics models for composite materials.

322. *Advanced Vibrations*. 3 HR. PR: MAE 122 or consent. Dynamic analysis of multiple degree-of-freedom discrete vibrating systems; Lagrangian formulation; matrix and numerical methods; impact; mechanical transients.

325. *Experimental Stress Analysis*. 3 HR. PR: MAE 132 or consent. Strain gage techniques and instrumentation; stress analysis using optical methods such as photoelasticity and interferometric techniques; NDE and NDT or problems involving stress analysis. 2 HR. lec., 3 HR. lab.

326. *Advanced Mechanics of Composite Materials*. 3 HR. PR: MAE 226 or consent. Manufacturing, testing, and diagnostics of composite materials. Anisotropic plates with cutouts. Inelastic behavior of polymer matrix composites. Analysis of advanced composites such as metal matrix, ceramic matrix, and textile.

330. *Instrumentation in Engineering*. 3 HR. PR: Consent. Theory of instrumentation suitable for measuring rapidly changing force, pressure, strain, temperature, vibration, etc.; computerized acquisition, analysis, and transmission of data; methods of noise reduction. 2 HR. lec. 3 HR. lab.

333. *Advanced Machine Design*. 3 HR. PR: MAE 135 or consent. Design for extreme environments, material selection, lubrication and wear, dynamic loads on cams, gears, and bearings, balancing of multiengines and rotors, electromechanical components.

335. *Advanced Kinematics of Mechanisms*. 3 HR. PR: MAE 210 or consent. Analytical synthesis of mechanisms with up to five accuracy points; Burmester curve theory and path curvature theory; force and moment balancing of mechanisms; computer-aided dynamic analysis of mechanisms and inverse dynamic analysis.

340. *Advanced Thermodynamics 1*. 3 HR. PR: MAE 141 or MAE 150. First and second laws of thermodynamics with emphasis on entropy production and availability (exergy); Maxwell's relationships and criteria for stability; equations of state and general thermodynamic equations for systems of constant chemical composition.

342. *Advanced Thermodynamics 2*. 3 HR. PR: MAE 340 or consent. Thermodynamics of multi-component inert and reacting systems; equilibrium analysis; introduction to irreversible processes involving diffusion and chemical kinetics; application of concepts to heterogeneous systems.

350. *Conduction Heat Transfer*. 3 HR. PR: MAE 158 or consent. Analytical and numerical solutions of steady and non-steady heat conduction problems in one, two, and three dimensional bodies; solution of linearized equations; applications include extended surfaces, moving surfaces, moving heat sources, and instrumentation techniques.

352. *Intermediate Dynamics*. 3 HR. PR: MAE 42. Newtonian and Lagrangian mechanics. Dynamics of discrete systems and rigid bodies analyzed utilizing Newtonian and Lagrangian formulations.

353. *Advanced Dynamics*. 3 HR. PR: MAE 352 or consent. Analytical mechanics. Stability of autonomous and nonautonomous systems considered and analytical solutions by perturbation techniques introduced. Hamilton-Jacobi equations developed. Problems involving spacecraft, gyroscopes, and celestial mechanics studied.

354. *Convection Heat Transfer*. 3 HR. PR: MAE 158 or consent. Laminar and turbulent flows in forced and free convection systems; external and internal flows with application to heat exchanger design; introduction to aerodynamic heating.

355. *Radiation Heat Transfer*. 3 HR. PR: MAE 158 or consent. Classical derivation of black body radiation laws; gray body and non-gray analysis; radiant properties of materials, radiant transport analysis, specular-diffuse networks, gas radiation, thermal radiation measurements; analytical, numerical solutions, and study of selected publications. 3 HR. lec.

360. *Fluid Mechanics 1*. 3 HR. PR: MAE 114 or equiv. Advanced dynamics and thermodynamics of fluids. Basic laws of conservation of mass and momentum in differential, vector, and integral forms. Application to internal flows, fluid machinery, and structures.

361. *Dynamics of Viscous Fluids*. 3 HR. PR: Consent. Derivation of and exact solutions for the Navier-Stokes equations; laminar boundary-layer theory, similarity solutions, and integral methods.

363. *Computational Fluid Dynamics*. II. 3 HR. PR: MAE 361 or equiv. Finite difference methods; convergence and stability; Navier-Stokes equations; discretization methods; grid distribution; solution of difference equations; pressure coupling; application to conduction/convection, boundary layers, and recirculating flows; introduction to general purpose CFD codes.

364. *Turbomachinery*. 3 HR. PR: MAE 101 or consent. Flow problems encountered in design of water, gas, and steam turbines, centrifugal and axial flow pumps and compressors, design parameters.

366. *Gas Dynamics*. 3 HR. PR: MAE 117 or equiv. Nonsteady gas dynamics and shock interactions; compressible flow theory in subsonic, transonic, and supersonic regimes, and their numerical treatment.

368. *Multiphase Flows*. 3 HR. PR: MAE 114. Particle dynamics including particle-particle and particle-surface interactions; fluidized bed concepts; mathematical models and numerical methods as applied to multiphase flows; design and instrumentation pertaining to multiphase units.

375. *Advanced Computer Aided Design*. I. 3 HR. PR: MAE 275 or equiv. Geometric modeling; finite element meshing; design approaches; case studies using CAD principles; projects utilizing state-of-the-art CAD packages 2 HR. lec., 3 HR. lab.

384. *Feedback Control in Mechanical Engineering*. 3 HR. PR: MAE 122 or consent. Emphasis on design of control systems using classical, frequency domain, and time domain methods; advanced mathematical modeling of physical systems, compensation, stabilization, pole placement, state estimation; extensive use of computerized design tools, especially Matlab.

386. *Robot Mechanics and Control*. 3 HR. Kinematic and dynamic behavior of industrial robot manipulators; formulation of equations of motion for link joint space and end effector Cartesian space; path planning and trajectory motion control schemes.

387. *Materials Engineering*. 3 HR. A study of materials engineering fundamentals emphasizing semiconductor, polymer, metal, and ceramic/cementitious material systems. Mechanical and physical properties, theoretical aspects, testing, design criteria, manufacturing, and economics of material systems. Laboratory testing and evaluation. (Equivalent to CE 387, CHE 387, EE 387, EM 387, and IMSE 387.)

391. *Advanced Topics*. 1-6 HR.

394. *Special Topics*. 1-6 HR. PR: Senior or graduate standing.

397. *Research*. 1-12 HR. PR: Graduate Standing.

399. *Special Problems*. 1-6 HR. PR: Senior or graduate standing.

412. *Fundamentals of Turbulent Flow*. 3 HR. PR: MAE 361 or consent. Basic experimental data. Application of semi-empirical theories to pipe, jet and boundary layer flow. Turbulent heat and mass transfer. Statistical theory of turbulence and recent applications.

414. *Theory of Elastic Stability*. 3 HR. PR: Consent. Stability of discrete mechanical systems, energy theorems, buckling of beams, beam columns, and frames, torsional buckling, buckling of plates and shells, special topics.

420. *Theory of Elasticity 2*. 3 HR. PR: MAE 320. Complex variable methods, stress couples, nonlinear elasticity, numerical methods, potential methods, boundary value problems, various special topics.

424. *Theory of Plates and Shells*. 3 HR. PR: MAE 311 or consent. Classical and modern theories of plates; dynamic response, nonlinear effects, and exact and approximate solutions of plates; application to rectangular and circular plates; membrane shells; shells with bending stiffness.

425. *Perfect Fluid Theory*. 3 HR. PR: Consent. Conformal mapping including Schwarz-Christoffel and Joukowski transformations. Inviscid flows over airfoils, spheres, cones, wedges, and bodies of revolution. 3 HR. lec.

445. *Hydrodynamic Stability Theory*. 3 HR. PR: MAE 361 or MAE 425 or consent. Response of flow field to disturbances; classical instability mechanisms; inviscid centrifugal instabilities; inviscid parallel shear flow stability; viscous boundary layer stability, the Orr-Sommerfeld equation; Rayleigh-Benard flow; introduction to nonlinear stability theory.

450. *Fundamentals of Combustion*. 3 HR. PR: MAE 141 or MAE 150. Thermodynamics, chemical kinetics, and diffusion of reacting gases; laminar and turbulent flames; flame stability and ignition.

484. *Advanced Topics in Control Theory*. 3 HR. PR: MAE 384 or MAE 241. State feedback through eigenstructure assignment; Observers and Kalman filters; multiple-model adaptive estimation and control; parameter estimation; direct and indirect model-reference adaptive-control algorithms; introduction to neural networks.

491. *Advanced Study*. 1-6 HR. PR: Consent. Advanced study in areas not covered by formal courses.

497. *Research*. 1-15 HR. PR: Graduate standing. Ph.D. dissertation research.

499. *Graduate Colloquium*. 1-6 HR. PR: Consent. For graduate students not seeking course work credit but who wish to meet residence requirements, use University facilities, and participate in its academic and cultural programs.

Mining Engineering

Syd S. Peng, Ph.D., Chairperson

365A Mineral Resources Building

Degree Offered:

Master of Science in Engineering of Mines

Doctor of Philosophy in Engineering with a major in Mining Engineering

Master of Science in Engineering of Mines (M.S.E.M.)

Students desiring to take courses for graduate credit at the master's level in the College of Engineering and Mineral Resources must first apply for admission and state a major field.

Applicants with a baccalaureate degree from institutions other than WVU in mining engineering will be admitted on the same basis as graduates of WVU. Lacking these qualifications, the applicant must first fulfill the requirements of the Department of Mining Engineering.

Academic Standards

Each student will, with the approval of the student's graduate committee—appointed with the consent of the student within the first semester of registration—follow a planned program. The program contains a minimum of 24 hours of course work and six hours of independent and original study in mining engineering leading to a master's thesis. At least 60 percent of the course credits must be from 300-level or 400-level courses while the remainder can be made up of 200-level courses.

Approval for candidacy for a graduate degree by faculty action is required to establish eligibility for a degree. A graduate student may request approval by formal application after completing a minimum of 12 semester hours of graduate courses with a grade-point average of at least 3.0 (B), based on all graduate courses in residence for which final grades have been recorded.

No credits are acceptable toward an advanced degree which are reported with a grade lower than C. To qualify for an advanced degree, a student must have a grade-point average of at least 3.0, based on all courses completed in residence for each graduate credit. Each candidate for a degree must select a major subject and submit a thesis showing independent, original study in mining engineering.

Doctor of Philosophy in Engineering (Ph.D.)

The principal objective of the doctor of philosophy program in mineral engineering is the education and training of graduates so that they are capable of attaining the highest levels in the mineral engineering profession and performing the professional roles of developing and improving the efficient extraction of solid mineral resources. The two areas of specialization are mine systems, and rock mechanics and ground control.

All applicants must have earned a M.S. degree in Mining Engineering with a GPA of 3.5 or higher. For all foreign applicants whose native language is not English, a TOEFL test score of 550 or better is required. In addition, each applicant is required to submit at least three letters of recommendation, one of which must be from the applicant's previous thesis advisor or an academic equivalent. All letters of recommendation should evaluate the student's potential for performing independent doctoral-level research.

The Ph.D. program in mineral engineering consists of 54 hours of course work and 30 hours of independent research beyond a bachelor's degree in mining engineering. The successful completion of a qualifying examination and an approved dissertation are also required.

Engineering of Mines (E M)

204. *Mining Methods for Vein Deposits*. I. 3 HR. PR: ENGR 2 and GEOL 151 and MATH 16. Methods and systems of mining other than flat seams. Emphasis on selection of methods in relation to cohesive strength of ore bodies and their enclosing wall rocks. Mining of anthracite included.

205. *Coal Mining*. I. 3 HR. PR: Junior standing or consent. (Not open to mining engineering students.) Introduction to elements of coal mining.

206. *Mining Exploration and Evaluation*. I. 3 HR. PR: GEOL 151 and STAT 101. Methods and procedures for mineral reconnaissance and exploration; geological considerations, various prospecting and exploration techniques, reserve estimation, and engineering economy.

207. *Longwall Mining*. II. 3 HR. PR: EM 105. Elements of longwall mining including panel layout and design considerations, strata mechanics, powered supports, coal cutting by shearer or plow, conveyor transportation, and face move.

211. *Rock Mechanics and Ground Control*. I. 4 HR. PR: EM 105 and EM 106 and MAE 41 and MAE 43 and GEOL 151. Rock properties and behavior, in situ stress field, mine layout and geological effects; design of entry, pillar, and bolt system, convergence and stress measurements, surface subsidence, roof control plan, slope stability, and laboratory sessions.

214. *Rock Mechanics*. I. 3 HR. PR: MAE 43 or consent. Elastic and plastic properties of rock, Mohr's criteria of failure, elastic theory, stress distributions around underground openings, open pit and underground stability, rock testing techniques.

224. *Special Subjects for Mining Engineering*. I, II. 1-6 HR. PR: Senior or graduate standing or consent. Special problems in mining engineering, including choices among operations research, mine systems analysis, coal and mineral preparation, and coal science and technology.

231. *Mine Environmental Engineering*. II. 3 HR. PR: EM 105 and MAE 114 and PR or CONC: MAE 101. Engineering principles, purposes, methods, and equipment applied to the underground environmental control including ventilation, illumination, and dust and noise control.

242. *Mine Health and Safety*. II. 3 HR. PR: EM 105 and EM 106. The nature of the federal and state laws pertaining to coal mine health and safety; emphasis will be placed on achieving compliance through effective mine planning, design, and mine health and safety management.

243. *Industrial Safety Engineering*. I. 3 HR. PR: Junior standing or consent. Problems of industrial safety and accident prevention, laws pertaining to industrial safety and health, compensation plans and laws, and industrial property protection.

271. *Mine and Safety Management*. I. 3 HR. PR: EM 105, 106, and 206. Economic, governmental, social, regulatory, cost, labor, environmental, and safety aspects of mining as related to the management of a mining enterprise.

276. *Mine and Mineral Reserve Valuation*. I. 3 HR. PR: Senior standing. Methods used to value mineral properties; factors affecting value of mineral properties.

286. *Fire Control Engineering*. II. 3-4 HR. PR: Senior standing. Aspects involved in the control from fire, explosion, and other related hazards. Protective considerations and building design and construction. Fire and explosive protection organization including fire detection and control. 3 HR. lec. and/or 3 HR. lab.

287. *Applied Geophysics for Mining Engineers*. I. 3 HR. PR: (EM 105 and EM 106 and PHYS 12 and GEOL 151) or consent. Origin of the universe and the planets, heat and age of the earth. Application of the science of geophysics in the Application of the science of geophysics in the location and analysis of earthquakes and in prospecting for oil and minerals.

291. *Mine Plant Design*. II. 3 HR. PR: Senior standing. Layout, analysis and detailing of the major mine installations and support facilities. Locations include: the surface plant, shaft and slope stations, section centers. Systems dealt with are bulk handling, power, ventilation, supplies, water, and personnel.

295. *Mine Systems Design*. I. 3 HR. PR: (EM 105 and EM 106) or consent. Each student selects and designs a mine subsystem under specified conditions, including extraction, transportation, ventilation, roof control, exploration, plant design, surface facilities, etc. 2 HR. lec., 1 HR. lab.

296. *Mine Design*. II. 4 HR. PR: Senior standing, final semester. Comprehensive design problem involving underground mining developments, surface plant or both, as selected by the student in consultation with instructor. Preparation of a complete report on the problem required, including drawings, specifications, and cost analysis.

311. *Advanced Ground Control-Coal Mines*. I, II. 3 HR. PR: EM 211 or consent. Ground and strata control for underground and surface coal mining, including slope stability and subsidence.

312. *Surface Subsidence Engineering*. II. 3 HR. PR: EM 211. Elements of surface subsidence engineering due to underground mining: theories of surface subsidence, characteristics and prediction of surface movements, and effects of surface movements.

316. *Advanced Rock Mechanics*. I. 3 HR. PR: EM 214 or consent. Testing techniques and interpretation, strength and fracture, classification, anisotropy, friction, jointed rock, fluid pressure, fragmentation, and excavation.

320. *Mobile Excavating and Materials Handling*. I. 3 HR. PR: Graduate standing and consent. Mobile mining equipment will be systematically analyzed as to functional, production failure, and operational aspects. Included will be routine and innovative methods, and surface and underground applications, such as the hydraulic shovel and impactors.

321. *Integrated Excavating and Materials Handling*. II. 3 HR. PR: Graduate standing and consent. Integrated mining equipment will be systematically analyzed as to functional, production, failure,

and operational aspects. Included will be routine and innovative methods, and surface and underground applications, such as the longwalls and monorails.

331. *Mine Ventilation Network Analysis*. II. 3 HR. PR: EM 231, M 281, or consent. Theory and computational techniques for mine ventilation network problems with emphasis on computer-aided analysis of complex mine ventilation systems.

332. *Advanced Mine Ventilation*. II. 3 HR. PR: EM 231. Advanced topics in mine atmospheric control including control of methane, dust, humidity, and heat. Also covers leakage characteristics, fan selection, analysis of ventilation networks, and planning of mine ventilation system.

342. *Advanced Mine Health and Safety*. I. 3 HR. PR: EM 242 or graduate standing. Special emphasis will be placed on mine rescue, mine disaster prevention and organization, and mine property and equipment loss prevention.

351. *Explosive Engineering Design*. II. 3 HR. PR: EM 251 or consent. Rock drilling, total blast systems simulation, experimental studies in blast design, rock fracturing, chemical thermodynamics, kinetics, and reaction rates.

365. *Deterministic Methods for Mineral Engineers*. I. 3 HR. PR: Graduate standing or consent. Analysis and solution of mineral engineering problems which require use of deterministic models. Application of deterministic methods to mineral transportation, mineral resource allocation and extraction problems, and mine planning and equipment utilization problems.

366. *Stochastic Methods for Mineral Engineers*. II. 3 HR. PR: Graduate standing or consent. Application of stochastic methods to mineral engineering problems in equipment selection, renewal processes, mine ventilation, mine production, and mineral extraction.

371. *Mine Production and Cost Management*. I, II. 3 HR. PR: M 281, EM 271. Planning manpower and material requirements for different mining methods, forecasting productivity from production sections, analysis of mine cost components, scheduling and control of mine operations, integrated optimization of mine cost and productivity.

387. *Materials Engineering*. 3 HR. A study of materials engineering fundamentals emphasizing semiconductor, polymer, metal, and ceramic/cementitious material systems. Mechanical and physical properties, theoretical aspects, testing, design criteria, manufacturing, and economics of material systems. Laboratory testing and evaluation. (Equivalent to CE 387, CHE 387, EE 387, IMSE 387, and MAE 387.)

391. *Advanced Mine Design*. I, II. 1-6 HR. PR: Graduate standing or consent. Advanced detail design and layout of coal mine plant, particularly incorporating new ideas of machines and mining methods.

394. *Special Topics*. I, II, S. 1-3 HR. PR: Graduate standing or consent. Selected field of study in mining engineering.

395. *Graduate Seminar in Coal Mining*. 3-6 HR.

396. *Grad Seminar Coal Mine*. 3-6 HR.

397. *Research*. I, II, S. 1-15 HR. PR: Consent. Research activities leading to a thesis, problem report, research paper, or equivalent scholarly project.

398. *Advanced Mine Design 1*. 1-6 HR. PR: EM 296. Detailed design of the components of coal mine subsystems including ground control, excavation and handling, and life support subsystems. 1-6 HR. lec.

399. *Advanced Mine Design 2*. 1-6 HR. PR: EM 296. Examination of the broad aspects of mine design for non-coal deposits. Consideration of deposits of various shapes, materials and qualities including country rock. Comparison of principles established for coal mine design. 1-6 HR. lec.

411. *Theories of Surface Subsidence*. 3 HR. PR: EM 312. Theories of surface subsidence due to underground coal mining including empirical, profile function, theoretical and physical modeling methods, and time factors. 3 HR. lec.

412. *Theory of Pillar Design*. 3 HR. PR: EM 211 and EM 311. Examination of various theories of pillar design for room and pillar mining and longwall mining including chain pillars, barrier pillars, and bleeder pillars.

416. *Theory of Rock Failure*. I. 3 HR. PR: EM 214 or consent. Friction, elasticity, strength of rock, mechanism of brittle failure, factors affecting failure process, theories of failure, fracture propagation in rock, fracture toughness of rock and coal, fluid pressure, size, stress gradient, and time-dependent effects.

417. *Laboratory and Field Instrumentation*. I. 3 HR. PR: (EM 211 and EM 214) or consent. Principles and applications of strain gages and photoelasticity for stress analysis in rock/coal; displacement/velocity gages and accelerometer for ground motion; holography and acoustic emission for nondestructive tests.

418. *Rock Mechanics in Mine Design*. II. 3 HR. PR: (EM 211 and EM 214) or consent. Design process in mining engineering; design approaches for excavations in rock; input parameters for design; empirical, observational, and analytical methods of design; integrated designs.

431. *Mine Ventilation Network Optimization*. I. 3 HR. PR: EM 331 or consent. Application of mathematical optimization techniques to mine ventilation network problems, including linear and nonlinear optimization for controlled-flow and generalized networks.

451. *Theory of High Explosives*. II. 3 HR. PR: EM 351 or consent. The application of chemical thermodynamics and the hydrodynamic theory to determine properties of high explosives, chemical equilibria and calculation of detonation and explosion-state variables.

465. *Optimization Applications in Mining*. 3 HR. PR: Graduate standing and EM 367. Detailed study and use of optimization techniques to solve mining problems, including programming techniques for large-scale linear, mixed-integer and 0-1, dynamic, nonlinear, and heuristic programming.

469. *Expert Systems in Mining*. II. 3 HR. PR: Graduate standing. An overview of expert systems applications in mining, a detailed study of two mining applications, study of shells and their components, and study of a specific shell used to develop a project.

490. *Teaching Practicum*. 1-3 HR.

491. *Advanced Study*. I, II, S. 1-6 HR. PR: Advanced graduate standing, consent. Selected field of study in mining engineering.

492. *Directed Study*. I, II, S. 1-6 HR. PR: Advanced graduate standing or consent. Directed study, reading, and/or research.

493. *Special Topics*. I, II, S. 1-6 HR. PR: Advanced graduate standing or consent. Contemporary topics selected from recent developments in mining engineering.

494. *Special Seminars*. I, II, S. 1-6 HR. PR: Advanced graduate standing or consent. Special seminars for advanced graduate students.

495. *Independent Study*. I, II, S. 1-6 HR. PR: Advanced graduate standing or consent. Faculty supervised study of topics not available through regular course offerings.

496. *Graduate Seminar*. I, II. 1 HR. PR: Consent. It is anticipated that each graduate student will present at least one seminar to the assembled faculty and graduate student body of the student's program.

497. *Research*. I, II, S. 1-15 HR.

498. *Thesis*. 2-4 HR.

499. *Graduate Colloquium*. I, II, S. 1-6 HR. PR: Consent. For graduate students not seeking course work credit but who wish to meet residence requirements, use the University's facilities, and participate in its academic and cultural programs.

Petroleum and Natural Gas Engineering

Samuel Ameri, P.E., M.S. in Petroleum Engineering, Chairperson

347A Mineral Resources Building

e-mail: info@cemr.wvu.edu

web: <http://www.cemr.wvu.edu/~wwwpe/>

Degree Offered:

Master of Science in Petroleum and Natural Gas Engineering

Doctor of Philosophy in Engineering with a major in Petroleum and Natural Gas Engineering

A student desiring to take courses for graduate credit at the master's level in the College of Engineering and Mineral Resources must first apply for admission and state the major field.

An applicant with a baccalaureate degree or its equivalent in petroleum or natural gas engineering from another institution will be admitted on the same basis as graduates of WVU. Lacking these qualifications, the applicant must first fulfill the CEMR requirements of the Department of Petroleum and Natural Gas Engineering.

Academic Standards

Each student will, with the approval of the student's advising and examining committee—appointed with the consent of the student within the first semester of registration—follow a planned program. The program contains a minimum of 24 hours of course work and six hours of independent and original study in the petroleum and natural gas engineering field leading to a master's thesis or 30 hours of course work and three hours of independent study leading to a comprehensive problem report. At least 60 percent of the course credits must be from 300- or 400-level courses while the remainder can be made up of 200-level courses.

Advanced Degree

No credits which are reported with a grade lower than C are acceptable toward an advanced degree. To qualify for an advanced degree, a graduate must have a grade-point average of at least 3.0 based on all courses completed in residence for graduate credit. Each candidate for a degree must select a major subject and submit a thesis showing independent, original study in petroleum engineering.

Each degree candidate is required to take PNGE 496.

Petroleum and Natural Gas Engineering (PNGE)

205. *Transport Phenomena in Petroleum Engineering*. II. 3 HR. PR: MAE 41. Introduction to fluid flow in pipes, two-phase flow, rotary drilling hydraulics, primary cementing jobs, flow calculations, flow measuring devices, fluid machinery, dimensional analysis, and heat transfer.

210. *Drilling Engineering*. II. 4 HR. PR or Conc.: GEOL 1 and MAE 114. Rock properties, functions and design considerations of rotating system, hoisting system, and circulation system; drilling fluids calculations and selections; hydraulic programs; drilling optimization; casing and casing string design; cementing programs; and pressure control.

211. *Production Engineering*. I. 3 HR. PR: PNGE 210. Well completion, performance of productive formulation, drill stem tests, completion of wells, flowing wells, gas lift methods and equipment, pumping installation design, well stimulation, emulsion, treating, gathering and storage of oil and gas, field automation. 3 HR. lec.

212. *Drilling Fluids Laboratory*. I, II. 1 HR. PR or Conc.: PNGE 210 and MAE 114. Topics include clay hydration, viscosity of water-based fluids, mud weight control, filtration studies, thinning agents, chemical contaminants, lime muds, polymer muds, rheological models, and liquid and solid determination.

224. *Petroleum Engineering Problems*. I, II, S. 1-3 HR. PR: Senior standing. Investigation of a special problem in petroleum engineering.
225. *Petroleum Engineering Ethics*. II. 1 HR. PR: Senior Standing. Introduction to petroleum and natural engineering ethics and moral issues concerning safety in engineering practice as well as those arising for engineers employed by corporations. Professionalism and professional registration.
232. *Petroleum Properties and Phase Behavior*. I. 3 HR. PR: Junior Standing. Theoretical and applied phase behavior of hydrocarbon systems and hydrocarbon fluid properties. Applications to petroleum reservoir and production engineering design. 2 HR. lec., 3 HR. lab.
233. *Elements of Petroleum Reservoir Engineering*. I. 3 HR. PR or Conc: PNGE 232. Basic properties of petroleum reservoir rocks. Fluid Flow through porous materials. Evaluation of oil and gas reserves.
234. *Applied Petroleum Reservoir Engineering*. I. 3 HR. PR: PNGE 233 or consent. Application of reservoir engineering data to calculation of recovery potentials and to analysis, simulation and prediction of reservoir performance under a variety of production methods to effect maximum conservation.
235. *Formation Evaluation*. I, II. 3 HR. PR: PNGE 210 or consent. Various well logging methods and related calculations with exercises in interpretation of data from actual well logs. 3 HR. lec.
241. *Oil and Gas Property Evaluation*. I. 3 HR. PR: PNGE 233; PR or Conc.: PNGE 211 and PNGE 235; or consent. Reserve estimation, decline analysis, petroleum property evaluation including interest calculations, cost estimation and tax evaluation. Overview investment decision analysis and computer applications in property evaluation.
244. *Petroleum Reservoir Engineering Laboratory*. I, II. 1 HR. PR or Conc.: PNGE 233. Laboratory evaluation of basic and special petroleum reservoir rock properties. 3 HR. lab.
262. *Introduction to Reservoir Simulation*. II. 3 HR. PR: M 281 and PNGE 234 or consent. Partial differential equations for fluid flow in porous media and the use of finite-difference equations in solving reservoir flow problems for various boundary conditions. Study of individual well pressures and fundamentals of history matching.
270. *Natural Gas Engineering*. I. 4 HR. PR: (PNGE 205 or MAE 114) and PNGE 233 and MAE 101) or consent. Natural gas properties, compression, transmission, processing, and application of reservoir engineering principles to predict the performance and design of gas, gas-condensate, and storage reservoirs. Includes a laboratory devoted to gas measurements. 3 HR. lec., 3 HR. lab.
271. *Natural Gas Production and Storage*. II. 3 HR. PR: PNGE 270. Development of gas and gas-condensate reservoirs; design and development of gas storage fields in depleted gas, gas-condensate, oil reservoirs and aquifers; design of natural gas production and processing equipment.
295. *Petroleum Engineering Design*. II. 3 HR. PR: (PNGE 211 and PNGE 234 and PNGE 241) or consent. Comprehensive problems in design involving systems in oil and gas production, field processing, transportation, and storage.
299. *Well Stimulation Design*. II. 3 HR. PR: (MAE 43 and PNGE 210 and PNGE 211 and PNGE 233 and PNGE 235) or consent. Fundamentals of well stimulation and treatment design and their applications to low permeability formations.
302. *Fluid Flow in Porous Media*. I. 3 HR. PR: PNGE 234 and MATH 18 or consent. Theoretical and practical aspects of the physical principles of hydrodynamics in porous media. 3 HR. lec.
340. *Secondary Recovery of Oil by Water Flooding*. I. 3 HR. PR: PNGE 233. Theory of immiscible fluid displacement mechanism, evaluation and economics of water flood projects, and oil field flooding techniques. 3 HR. lec.
343. *Advanced Secondary Recovery*. II. 3 HR. PR: PNGE 340. Secondary recovery of oil by gas flooding, miscible fluid injection, in situ combustion, and heat injection. 3 HR. lec.

362. *Reservoir Simulation and Modeling*. II. 3 HR. PR: PNGE 262 or consent. Application of finite-difference equations to multi-phase fluid flow in porous media in two or three dimensions with gravity and capillary pressure effects. Simulation of waterflood performance and enhanced recovery techniques.

384. *Pressure Transient Analysis*. II. 3 HR. PR: PNGE 234 or consent. Methods of analysis of pressure transient data obtained from well testing for the purpose of determining in-situ reservoir conditions including porosity, lateral extent, average reservoir pressure, and formation permeability.

391. *Advanced Topics*. 1-6 HR.

394. *Special Topics*. I, II, S. 1-6 HR. PR: Consent. Selected fields of study in petroleum and natural gas engineering.

397. *Master's Degree Research or Thesis*. I, II, S. 1-15 HR. PR: Consent. Research activities leading to a thesis, problem report, research paper, or equivalent scholarly project.

490. *Teaching Practicum*. 1-3 HR.

491. *Advanced Study*. 1-6 HR.

492. *Directed Study*. 1-6 HR.

493. *Special Topics*. 1-6 HR.

494. *Special Seminars*. 1-6 HR.

495. *Independent Study*. 1-6 HR.

496. *Graduate Seminar*. I. 1 HR. PR: Consent. Individual study and oral presentation of selected topics in petroleum engineering. Current petroleum literature and research are discussed.

497. *Research*. I, II, S. 1-15 HR.

498. *Thesis*. 2-4 HR.

Safety and Environmental Management

Warren R. Myers, Ph.D., CIH, Interim Chairperson

325A Mineral Resources Building

e-mail: sem@cemr.wvu.edu

web: <http://www.cemr.wvu.edu/~wwwsem/>

Degree Offered:

Master of Science in Safety Management

A concentration or major in safety management at the master's degree level provides an opportunity for individuals to elect courses and related experiences aimed at developing competencies needed by traffic safety educators, occupational safety managers, or school safety coordinators. Students are admitted from a variety of baccalaureate degree programs and are required to meet ABET/RAC prerequisite course requirements which are currently a minimum of 23 credit hours of science and mathematics, 60 credit hours of engineering technology or safety related specialties, and 15 credit hours of communication and humanities. The GRE or Miler's Analogy Test is required.

Safety and Environmental Management (SEM)

(NOTE: Enrollment in all SEM courses by permit only)

291. *Special Topics*. 2-6 HR. PR: Consent. Consideration of persistent issues and changing problems in the safety field. Seminar emphasis extends considerable attention to safety interests of participating class members.

301. *Safety Function Management Integration*. 3 HR. PR: Consent. Consideration of integrated arrangements, common constraints, development level, essential guidelines, staff liaison, project improvement, effectiveness adults, and collaboration needed to assure success of the safety function.

303. *Risk Counteractant Resource Preparedness*. 3 HR. PR: Consent. Counteraction of risk involving deficient resource preparedness by emphasizing problems delineation, ergonomic adjustments, work-task analyses, performance standards, quality supervision, essential training, and pertinent management techniques.

310. *Controlling Environmental and Personnel Hazards*. 3 HR. PR: Consent. Investigation of hazard control principles relating to environmental facilities and equipment including control procedures recommended by authorities from the fields of engineering, medicine, and public health as well as from the field of safety.

331. *Safety in Motor Transportation Services*. 3 HR. PR: Consent. Safety elements of automotive transportation including design, operation, planning, control, and effects of legislation.

332. *Safety Education Principles and Content*. 3 HR. PR: Consent. Study and analysis of content areas usually recommended for instructional programs within the field of safety, with emphasis on structured learning experiences.

333. *Disaster Preparedness and Emergency Systems*. 3 HR. PR: Consent. Major elements involved in disasters and emergencies, preparedness planning, systems utilization, and attention to essential human services, with emphasis on community action.

334. *Establishing and Managing Fire Services*. 3 HR. Analysis of fire services usually provided under safety manager jurisdiction, with special attention to legal bases, organizational structure, services rendered, training needs, and management techniques.

335. *Safety Legislation and Compliance Operations*. 3 HR. PR: Consent. Comprehensive study and analysis of federal and state legislation which mandates compliance with certain safety conditions and practices related to work performed in occupational and comparable settings.

339. *Security Management Practices and Problems*. 3 HR. Safety manager responsibilities for security of persons and property including organizations patterns, personnel competencies expected, surveillance and monitoring methods, and occupational problems among security personnel.

340. *Instrumentation for Safety Managers*. 3 HR. PR: Consent. Anticipation, recognition, evaluation of industrial hygiene topics encountered by safety managers. Fundamental instrumentation techniques are presented in laboratory and lecture formats. Management-oriented control and remediation programs are developed.

358. *Substance Abuse in the Workplace*. II. 3 HR. PR: Consent. The problem, nature, and effects of drug/ alcohol use in the workplace; approaches for treatment and avoidance such as EAP's, community programs, and testing; development of management approaches and programs.

364. *Identifying and Correcting Disabled Resources*. 3 HR. PR: Consent. Hazard recognition and reporting; examination of insurance variations, counseling, rehabilitation, and recovery of efforts; employing remediation and correction services; using specialists; establishing liaisons; developing evaluation methods and control of loss-producing situations involving people and property.

391. *Advanced Topics*. 1-6 HR. PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

397. *Master's Degree Research or Thesis*. I, II, S. 1-15 HR. PR: Consent. Research activities leading to a thesis, problem report, research paper, or equivalent scholarly project.

418. *Safety, Measurement, Evaluation, and Research*. 3 HR. Analysis of evaluative data and statistical procedures applicable to the safety field plus investigation of the nature and purposes of research dealing with safety and accident prevention with emphasis on human and environmental factors.

452. *Manpower Development for Safety Responsibilities*. 3 HR. PR: Graduate standing in safety studies and consent. Safety manpower positions, needs, and problems in relation to efforts by business, industrial, governmental, and educational agencies to provide sufficiently effective professional and subprofessional preparation of safety practitioners.

459. *Directed Study*. 1-6 HR. PR: Doctoral level standing and consent. Analysis of research designs and procedures for compilation, organization, treatment, and interpretation of data for safety research projects.

460. *Biomechanics of Safety Management*. 3 HR. PR: Departmental consent. Applying the laws of physics to describe the abilities and limitations of the human body biomechanically and physiologically in order to maintain safety, quality, and productivity objectives; based on safety management principles.

468. *Essential Safety Management Information*. 3 HR. PR: Consent. Examination of information needed for safety management success, harm investigation procedures, evaluation techniques, nonrealized profit calculations, and decision-making which should enhance improvement of all safety function affairs.

472. *Practicum*. 1-6 HR. PR: Consent. Individual and/or group experiences in development, implementation, and participation in special projects involving safety education, safety services, and environmental safety in schools, colleges, or communities.

College of Human Resources and Education

William L. Deaton, Ph.D., Dean

Ernest R. Goeres, Ph.D., Associate Dean for Research and Development

Anne H. Nardi, Ph.D., Associate Dean for Academic Affairs

Graduate Programs

Counseling Psychology	Ph.D.
Education	Ed.D.
Counseling	M.A.
Educational Leadership Studies	M.A.
Educational Psychology	M.A.
Elementary Education	M.A.
Reading	M.A.
Rehabilitation Counseling	M.S.
Secondary Education	M.A.
Special Education	M.A.
Speech Pathology and Audiology	M.S.
Technology Education	M.A.

The College of Human Resources and Education, located in Allen Hall on the Evansdale Campus, offers graduate level programs of study in counseling, counseling psychology, rehabilitation counseling, special education, speech pathology and audiology, curriculum and instruction, educational leadership, elementary education, reading, secondary education, education foundations, educational psychology, and technology education. Thesis programs are devoted to the study and development of human talent and resources in the school, family, and community. Instruction, research, and extended service are carried out in close cooperation with related departments and units of the University.

Doctoral Programs

If you would like additional information about the graduate programs in the College of Human Resources and Education, please contact the chairperson of the department most relevant to your program interests. Students in the doctor of education (Ed.D.) program may elect an area of emphasis in curriculum and instruction, educational leadership studies, educational psychology, reading, special education, or technology education. Specific information about doctoral studies in these emphasis areas is listed in the program description area of the catalog. Students interested in the doctor of philosophy (Ph.D) in counseling psychology will find information about that program in a separate area of this catalog.

Admission Admission, curriculum, and degree requirements of the various degree programs of the College of Human Resources and Education are provided in each program section in this catalog. It is the responsibility of the student to take steps to insure that he or she is properly informed of the degree requirements and/or the certification standards being sought. Since certification requirements are changed periodically by the state, the fulfillment of certification requirements as presented in this catalog can not guarantee compliance with the most recent requirements. The West Virginia State Department of Education requires that a degree be from an accredited institution of higher education for licensure and salary purposes. Students are therefore encouraged to seek the counsel of members of the faculty, their advisors, and the college certification officer on matters pertaining to degree and certification requirements.

All applicants for admission to the doctoral program in the College of Human Resources and Education must submit their scores on the aptitude test of the Graduate Record Examination and/or the Miller Analogies Test, three letters of recommendation, a current vita, a statement of long-range and short-range goals, and their reasons for selecting WVU as the institution for matriculation. Applicants to HR&E must comply with the general University graduate study regulations. Personal interviews are required by several programs. Additional information may be required by the faculty of a specific area of emphasis prior to program admission.

Committee Formation After admission to a specific program, the student, in consultation with the advisor, selects a chairperson and four committee members to serve as his or her doctoral committee. This committee must be approved by the department chair, and the dean of the college. The doctoral committee must meet the following minimum standards:

- The doctoral committee must be composed of a minimum of five members, the majority of whom must be regular members of the graduate faculty.
- At least three members of the doctoral committee must be members of the graduate faculty of the College of Human Resources and Education.
- The student's major advisor must be from the student's major program area and must be a regular member of the graduate faculty. No more than two other members of the doctoral committee may be from the student's major program area of study.
- At least two members of the doctoral committee must be from the student's major program area of study.
- At least one member of the doctoral committee must be from the student's minor program area of study.
- The doctoral committee must include at least one member from outside the student's program area, and that individual must have knowledge and insights relevant to the student's program of study.
- No more than one member of the doctoral committee may be a nonmember of the graduate faculty.

Program Plan The final determination of the program of course work and research is the responsibility of the student's doctoral committee. The doctor of education degree is not awarded on the basis of the completion of any set number of credits, but is awarded on the basis of demonstrated academic achievement and scholarly competence. Seventy-two semester hours of relevant graduate work, excluding dissertation credit, but including credits of relevant graduate work completed at the master's degree level, constitutes the minimum course work acceptable. The doctoral program must include course work in three areas: major, minor, and foundations, and the program requirements in each area must be met.

Candidacy The purposes of the admission to candidacy examination are to assess the quality of the student's academic achievement, to review the student's program of course work, to approve a proposed outline of dissertation research, and to admit the student to formal candidacy for the doctoral degree. The student and the committee at the time of program planning will identify competencies to be developed and how they will be assessed. These will be stated in the student's individual program. The doctoral student and his or her doctoral committee will determine when the student is ready for assessment of competencies. The examination will be prepared and assessed by the student's doctoral committee and will address all work in the doctoral program plan of the student. The chairperson will notify the student and the student records office, who will notify all appropriate University and college offices of the outcome. Upon successful completion of the admission to candidacy examination, and the acceptance by the committee of the dissertation prospectus, the student will be admitted to formal candidacy for the doctoral degree.

Prospectus The candidate must submit and justify a prospectus for a doctoral dissertation as a portion of the admission to candidacy examination. The doctoral committee must review and *approve*, *approve with change*, or *reject* the outline or prospectus. The student must consult with all members of the doctoral committee and with other appropriate members of the University faculty during the dissertation phase of the program.

Final Oral Examinations The student will be admitted to the final oral examination upon completion of the dissertation and after fulfilling all other requirements set by the committee. The examination will be conducted by the student's doctoral committee and the publicized meeting will be open to all members of the University faculty. If the student receives more than one unfavorable vote from the doctoral committee, the candidate will not be recommended for the doctoral degree.

Time Limitation If the student should fail to complete an approved dissertation within five years after being admitted to candidacy, he or she must repeat the admission to candidacy examination and any other requirements specified by the student's doctoral committee. A student must satisfactorily complete a minimum of nine semester hours of approved graduate credit in each of two consecutive terms in residence.

All graduate students are admitted in one of the three University classifications and are responsible for making a formal request for change of status.

Masters Degree Programs

Three options are generally available in HR&E's master's programs; the student should refer to the specific program to determine the option that applies.

Master's degree programs are offered in counseling, rehabilitation counseling, speech pathology and audiology, educational leadership studies, educational psychology, elementary education, reading, secondary education, special education, and technology education.

- A. At least 30 semester hours of course work, including six semester hours of research.
- B. At least 30 semester hours of course work, including three semester hours of research, selected in conference with the candidate's committee, directed by the advisor, with final approval by the committee, and 27 semester hours of course work.
- C. At least 36 semester hours of approved course work.
 - The student must comply with specific graduate requirements of the University, the College of Human Resources and Education, and the program.
 - All students will be assigned an advisor. Two additional faculty members will be assigned to serve as the remainder of the three-member master's committee.
 - No student may be awarded a master's degree unless the student has a minimum grade-point average of 3.0 on all work taken for the graduate degree. (A grade of less than C does not carry credit toward a graduate degree, but counts in determining the grade-point average.)
 - No student will be permitted to repeat a required graduate course more than once.
 - Many programs require the comprehensive examination in options A, B, and C above. The candidate's committee will determine whether the examination will be oral or written or both. Within the first two weeks of the semester in which the student intends to take the final master's degree examination, he or she must submit to the appropriate department chair an application to take the examination. A student must have completed a minimum of 27 semester hours of approved course work before taking the comprehensive examination. In addition,

a student must have achieved a 3.0 grade-point average of all work taken for graduate credit before applying to take the comprehensive examination.

Second Examinations A candidate who fails the final master's degree examination may, upon written consent of the student's advisory committee, be given a second examination not earlier than the following session or semester. A candidate who fails the second examination and desires a third opportunity to complete program requirements may meet, at the committee's discretion, to determine remediation recommendation before the third and final attempt at the examination. The third examination may be given no earlier than one calendar year from the second examination. If the student fails the third comprehensive examination, the student will be removed from the degree program.

Time Limit All requirements must be completed within eight years immediately preceding the awarding of the degree.

Non-Degree Status

Students who fail to meet the specific requirements of the sections dealing with admission, grade-point average, course repeats, transfer credits, comprehensive examinations, or special written requirements specified by the program will not be admitted to or will be terminated from the degree program. Students not admitted to or terminated from a degree program may apply in writing for classification as a non-degree graduate student to the appropriate department chair or the Office of Student Advising and Records of the College of Human Resources and Education, (P.O. Box 6122, Morgantown, WV 26506-6122.) Non-degree classification would allow the student to take course work for certificate renewal, certification, or personal interest. A non-degree graduate student may accumulate unlimited graduate credit hours, but if the student is later admitted to a degree program, the faculty of that program will decide whether or not any credit earned as a non-degree student may be applied to the degree. **Under no circumstances may a non-degree apply more than 12 hours of previously earned credit toward a degree.**

Students may obtain additional information about a particular graduate program by writing to the coordinator of that program or by writing the Dean, College of Human Resources and Education, West Virginia University, P.O. Box 6122, Morgantown, WV 26506-6122.

Graduate Faculty

† Indicates regular member of graduate faculty.

* Indicates associate member of graduate faculty.

Counseling, Rehabilitation Counseling, and Counseling Psychology Professors

†L. Sherilyn Cormier, Ph.D. (Purdue U.). Counseling Psychology. Counseling psychology training and clinical supervision models, Advanced psychotherapeutic techniques.

*James DeLo, Ph.D. (U. Pitt.). Counseling, Coordinator, off-campus counseling programs. Field work coordinator, Adult development.

†Ranjit K. Majumder, Ph.D. (U. Okla.). Rehabilitation Psychology, Rehabilitation counseling.

†Robert P. Marinelli, Ed.D. (Penn. St. U.). Coordinator, Master's Degree Program in Rehabilitation Counseling. Rehabilitation counseling and psychology, vocational counseling and psychology, Ethical issues in counseling psychology and rehabilitation.

†Robert L. Masson, Ed.D. (SUNY). Rehabilitation. Group counseling.

†Jeffrey K. Messing, Ed.D. (Syracuse U.). Counseling. Rehabilitation and Counseling Psychology Chairperson, Counseling Psychology, Vocational psychology, Consulting models, Program design, Conflict resolution and mediation.

- †David J. Srebalus, Ed.D. (Ind. U.). Counseling Psychology. Vocational psychology, Career counseling, Counseling and psychotherapy theories.
- †Roy H. Tunick, Ed.D. (U. N. Colo.) Rehabilitation psychology, Counseling psychology, Psychological and vocational assessment, Vocational psychology, Psychology of disability, Mental health rehabilitation, Adolescents in crisis.
- †Michael T. Yura, Ph.D. (Ohio St. U.). Counseling. Child play therapy, Handicapped children, Vocational development.

Associate Professors

- †Edward E. Jacobs, Ph.D. (Fla. St. U.). Counseling. Creative counseling, Group counseling, Marriage and family, Impact therapy.
- Kathryn B. Greever, Ed.D. (WVU). *Emeritus*.
- †Cynthia R. Koladner, Ph.D. (Penn. St. U.). Director of Training, Doctoral program in counseling psychology, Counseling psychology research and professional issues. Eating disorders, Feminist/cognitive behavioral theory.

Assistant Professor

- *Elizabeth Iglesias, Ed.D. (Penn. St. U.). Cross-cultural counseling and gender issues, Career counseling.

Educational Theory and Practice

Professors

- *John L. Carline, Ph.D. (Syracuse U.). *Emeritus*.
- J. William Douglas, Ph.D. (Ohio St. U.). Adjunct. Management theory, History and philosophy of sport.
- Marilyn Fairbanks, Ed.D. (WVU). *Emeritus*.
- †Richard D. Hawthorne, Ph.D. (U. Wisc.). Curriculum development, Professional development, School reform.
- *Mary E. Haas, Ed.D. (Ind. U.). Social studies education, Geographic education, Global education.
- †Boyd D. Holtan, Ed.D. (U. Illinois). *Emeritus*.
- †Ronald V. Iannone, Ed.D. (Syracuse U.). Creative drama, Aesthetic education, Alternative education.
- Layle D. Lawrence, Ph.D. (LSU). Adjunct. Secondary agricultural education, Youth organization, Extension education.
- †Thomas P. Lombardi, Ed.D. (U. Ariz.). Learning disabilities, Mental retardation.
- †Barbara L. Ludlow, Ed.D. (WVU). Severe/multiple disabilities, Clinical supervision, Early intervention.
- †Roy A. Moxley, Ph.D. (U. Mich.). Early childhood education, Early literacy, Educational technology.
- *C. Kenneth Murray, Ph.D. (Ohio St. U.). Social studies education, Economic education, Teacher education.
- Gabriel A. Nardi, Ph.D. (U. Wisc.). Behavior disorders, Mental retardation.
- †Patricia A. Obenauf, Ed.D. (U. Va.). Curriculum development, Science education, Conceptual models.
- †W. Michael Reed, Ed.D. (VPI & SU). Director, Microcomputer Lab, English education, Hypermedia, Software development.
- †Steven D. Rinehart, Ed.D. (WVU). Reading education, Language arts, Teacher education.
- †R. Jerrald Shive, Ed.D. (U. Ill.). Chairperson. Curriculum, Foundations of education, Social studies education, Equity in education.
- †Patricia K. Smith, Ed.D. (WVU).
- †Charles Wales, Ph.D. (Purdue U.). *Emeritus*.
- †Wilfred D. Wienke, Ed.D. (U. N. Colo.). Professional development, Mental retardation, Research.

Associate Professors

- *W. Scott Bower, Ph.D. (Ohio St. U.). Teaching strategies, Curriculum development, Teacher effectiveness.
- †Ardeth M. Deay, Ph.D. (Cornell U.). Classroom organization and management, Rural women in education, Peace education.
- Stacy A. Gartin, Ph.D. (Ohio St. U.). Adult agricultural education, Communications, Leadership development.
- Suzanne Martin, Ph.D. (U. Fla.). Behavioral disabilities.

†Perry D. Phillips, Ed.D. (WVU). Social studies education, Teacher education.

†Randall L. Wiesenmayer, Ph.D. (Penn. St. U.). Science education, Science/technology/society (STS) education, Environmental education.

†Diane T. Woodrum, Ed.D. (WVU). Mental retardation, Behavior disorders, Learning disabilities.

Assistant Professors

Judy Abbott, Ph.D. (U. TX). Literacy education, Children's writing, Motivation, Children's literature.

†Gretchen Butera, Ph.D. (UC at Santa Barbara). Early intervention, Clinical Supervision.

Michael A. Caruso, M.A. (WVU). *Emeritus*.

Elizabeth Dooley, Ed.D. (WVU). Learning disabilities, Behavior disorders, Minority concerns.

Shirley T. Fogleman, (Louisiana State U.). Literacy, Middle school education.

*Nancy Hoffman, Ed.D. (Penn. St. U.). Supervision, Staff development, Effective teaching.

Barbara Mertins, M.S.L.S. (Syracuse U.). *Emeritus*.

Kerry S. Odell, Ph.D. (Ohio St. U.). Adjunct. Research methodology, Microcomputer applications, Teaching methods.

Eric Pyle, Ph.D. (U. of Ga.). Science education, Motivation/social cognition, Earth science education, Research methodology.

James Rye, Ph.D. (Penn. St. U.). Science concept learning; Science/technology/society education, Human nutrition and health education.

†Joy F. Saab, Ed.D. (WVU). Early childhood, Creative arts, Foxfire.

Louise Savage, Ed.D. (WVU). *Emeritus*.

Lecturer

*Judy Werner, M.A. (Newark). Gifted, Technology in special education.

Educational Psychology

Professors

Benjamin H. Bailey, Ed.D. (U. Fla.). *Emeritus*.

William L. Deaton, Ph.D. (U. Kansas). Applied statistical analysis, Research design, Measurement.

†Lawrence Fraley, Jr., Ed.D. (USC). Conceptual foundations of behaviorology, The science of human behavior applied to instructional development and teaching.

†Daniel E. Hursh, Ph.D. (U. Kans.). Developmental and child psychology, Instructional and environmental design. Language development.

*Rogers McAvoy, Ph.D. (Ind. U.). *Emeritus*.

†Anne H. Nardi, Ph.D. (WVU). Developmental psychology, Problem solving, Adult learning.

†John J. Paterson, Ed.D. (Mich. St. U.). *Emeritus*.

†W. Michael Reed, Ed.D. (VPI & SU). Adjunct. Microcomputer research, Writing research, Cognition and writing.

Meng Shu Tseng, Ed.D. (Ind. U.) *Emeritus*.

†Julie S. Vargas, Ph.D. (U. Pitt.). Instructional design, Behavioral analysis, Microcomputers, Verbal behavior.

†Richard T. Walls, Ph.D. (Penn. St. U.). Educational psychology, Human learning, Problem solving, Vocational rehabilitation.

Associate Professors

*Floyd L. Stead, Ed.D. (WVU). Education, Educational measurement, evaluation, and research.

Assistant Professors

Thomas M. Bell, Ph.D. (W. Mich. U.). Adjunct. Behavioral assessment, Behavior management, Quantitative analysis, Instructional systems.

†Rayne S. Dennison, Ph.D. (U. Neb.-Lincoln). Cognitive development, Metacognition, Learner strategies.

Susan M. Rodman, Ed.D. (WVU). Adjunct. Computer and information systems, Statistical methods.

*Floyd K. Russell, Ed.D. (WVU). Adjunct. Computer based instruction, Hypertext, Multimedia, Distance learning, Instructional design.

Educational Leadership Studies

Professors

†Robert Bickel, Ph.D. (FSU). MU Graduate College, Social Foundations, Research Methods.

John Buskey, MU Graduate College.

- *Ronald Childress, Ed.D. (U. Tenn.). MU Graduate College. Instructional management.
- *Larry Froehlich, MU Graduate College.
- *Ernest R. Goeres, Ph.D. (U. Iowa). Associate Dean. Higher education finance, College business management, Economics of higher education.
- *Richard A. Hartnett, Ed.D. (WVU). Comparative higher education. Administrative theory, Academic governance, Collective bargaining.
- Helen M. Hazi, Ph.D. (U. Pitt.). Legal issues affecting instructional supervision.
- *Paul A. Leary, Ph.D. (U. Mass.). MU Graduate College. Public school administration/research.
- Dennis Prisk, MU Graduate College.
- *James Ranson, Ph.D. (Ohio St. U.). MU Graduate College. Secondary education, Education research.
- *Powell Toth, Ph.D. (Ohio St.) MU Graduate College. Public school administration.
- *Tony Williams, Ed.D. (WVU) MU Graduate College. Social foundations, Curriculum/instruction.
- *Jack E. Yeager, Ed.D. (VPI & SU). MU Graduate College. Higher education law, Politics of education, Public school administration.
- *Ken M. Young, Ed.D. (VPI & SU). MU Graduate College. School principalship, Public school administration.

Associate Professors

- *Daisy Arredondo, Ph.D. (U. Wash.). Program unit coordinator, School leadership, Supervision and school reform.
- *Billy K. Gordon, Ed.D. (U. KY). MU Graduate College. Supervision, General school administration.
- *Barbara Nicholson, MU Graduate College, Supervision.
- *Linda Spatig, Ed.D. (U. Houston). MU Graduate College. Social Foundations, Research Methods.
- *Michael Sullivan, Ed.D. (WVU). MU Graduate College. Organization and administration.

Assistant Professors

- *Phyllis Durden, Ed.D. (U. of Wash.). Public school leadership, assessment, and evaluation, Politics of education.
- *Elizabeth A. Jones, Ph.D. (Penn State U.). Higher Education Administration, assessment and curriculum development.
- *Michael Cunningham, Ed.D. (WVU). MU Graduate College.

Adjunct Teaching and Field Practice Resource Personnel

- Shannon Rae Bennett, Ed.D. (WVU). Adjunct. Supervisor, Randolph County Schools.
- Sharon Z. Brisbin, Ed.D. (WVU). Adjunct. Teacher, Harrison County Schools.
- Harold C. Carl, II, Ed.D. (WVU). Adjunct. Superintendent, Pleasants County Schools.
- Janice Christopher, Ed.D. (WVU). Mon. Co. Assistant Superintendent.
- Martha D. Dean, Ed.D. (WVU). Adjunct. Superintendent, Wetzel County Schools.
- D. Lyn Dotson, Doctor of Jurisprudence. (WVU). Adjunct. Vice President for Development, WVU Foundation, Inc.
- Linda S. Dunn, Ed.D. (Va. Tech.). Adjunct. President, WV Northern Community College.
- Sharon D. Harsh, Ed.D. (WVU). Adjunct. Assistant Superintendent of Schools, Barbour County Schools.
- Kenneth E. Kelly, Ed.D. (Geo. Wash. U.). Adjunct. Vice President for Student Affairs and Associate Professor Management, Fairmont State College.
- Scott C. Kelley, Ed.D. (Harvard U.). Adjunct. Vice President Administration and Finance, WVU.
- Richard H. Martin, Ed.D. (WVU). Adjunct. Principal, Mt. Lebanon High School, Pittsburgh, PA.
- Florita S. Montgomery, Ed.D. (WVU). Adjunct. Extension Associate Professor and Extension Communications Specialist, WVU Extension Service.
- Robert N. Moore, Ph.D. (U. Rochester). Ed.D. (WVU). DDS (Northwestern U., Illinois). Adjunct. Dean of Dentistry, WVU.
- Joseph A. Paull, Ed.D. (WVU). Adjunct. Assistant Executive Director, RESA VII.
- P. William Rosier, Ed.D. (WVU). Adjunct. Retired Public School Administrator.
- Edward W. Shirley, Ed.D. (WVU). Adjunct. High School Principal, Rockville, MD.
- Thomas S. Sloane, Ph.D. (Ohio St. U.). Adjunct. Assistant Dean, Student Life. College student, Student development.
- Douglas C. Smith, Ph.D. (Penn. St. U.). Adjunct. Program Coordinator, Off-Campus Credit, Shepherdstown, WV.
- Gary G. Smith, Ed.D. (WVU). Adjunct. Principal, Clay-Battelle High School.

Social and Cultural Foundations

Professors

Franklin Parker, Ed.D. (G. Peabody TC). *Emeritus*.

Mary I. Yeazell, Ed.D. (U. Ill.). *Emerita*.

Associate Professor

[†]Van O. Dempsey, III, Ph.D. (UNC). Sociology of education, Social foundations of education, Qualitative research methodology.

Esther E. Gottlieb, Ph.D. (U. Pitt.). Adjunct. Comparative and international education, Qualitative research methodology, Teacher education.

[†]Samuel F. Stack, Jr., Ph.D. (USC). History, Philosophy and sociology of education, Educational theory.

Assistant Professors

Jaci Webb-Dempsey, Ph.D. (UNC). Adjunct. Qualitative research and evaluation methodology, Social contexts of learning, Educational policy and school reform.

Speech Pathology and Audiology

Professors

[†]Carolyn P. Atkins, Ed.D. (WVU). Speech Pathology. Speech improvement, Clinical supervision.

[†]Mary Ellen Tekieli Koay, Ph.D. (U. Okla.). Speech Pathology. Cleft palate, Neurophysiology, Neuropathologies, Clinical supervision.

[†]Norman J. Lass, Ph.D. (Purdue U.). Speech Pathology. Speech perception, Speech acoustics.

[†]Dennis M. Ruscello, Ph.D. (U. Ariz.). Speech Pathology. Phonogy, Cranio facial anomalies, Clinical supervision.

[†]Kenneth O. St. Louis, Ph.D. (U. Minn.). Speech Pathology. Fluency, Voice, Clinical supervision.

[†]Charles M. Woodford, Ph.D. (Syracuse U.). Audiology. Audiological evaluation, Industrial and environmental audiology, Clinical supervision.

Associate Professors

[†]Conrad Lundeen, Ph.D. (U. Iowa). Chairperson. Audiology. Aural rehabilitation, Central auditory disorders.

[†]Linda I. Shuster, Ph.D. (Ohio St. U.). Speech Pathology. Aphasia, Speech perception.

Assistant Professors

Lynn R. Cartwright, Ed.D. (WVU). Speech Pathology. Parent involvement, Clinical supervision.

Karen Barr Haines, M.S. (WVU). Clinical. Speech Pathology. Augmentative communication, Clinical supervision.

Robin R. Jones, M.S. (WVU). Audiology. Aural rehabilitation, Clinical supervision.

Cheryl L. Prichard, M.S. (WVU). Speech Pathology. Public school clinical programs, Rural education, Clinical supervision.

Susan L. Ryberg, M.S. (Boston U.). Speech pathology, Part-time program coordinator, Clinical supervision.

Technology Education

Professors

Paul W. DeVore, Ph.D. (Penn. St. U.). *Emeritus*.

[†]David L. McCrory, Ph.D. (Case West. Res. U.). Chairperson. Curriculum studies/evaluation, Technology transfer, Professional development.

[†]Edward C. Pytlik, Ph.D. (Iowa St. U.). Technology education, Production systems, International development.

Associate Professor

[†]George R. Maughan, Jr., Ed.D. (WVU). Technology education, Communication/information systems, Microcomputers, Curriculum development.

Assistant Professor

[†]John Wells, Ph.D. (Va. Tech.). Technology education, Biotechnical systems, Curriculum development.

Counseling

Jeffrey K. Messing, Department Chairperson

502 Allen Hall

P.O. Box 6122

Degree Offered:

**Master of Arts; Area of Emphasis for Doctorate of Philosophy is
Counseling Psychology**

Master of Arts in Counseling

The Department of Counseling, Rehabilitation Counseling, and Counseling Psychology of the College of Human Resources and Education offers a master's program in counseling. The counseling M.A. program is fully accredited by the Council for Accreditation of Counseling and Related Educational Programs (CACREP). Variations in the curriculum allow emphasis in school counseling and community agency/mental health counseling. All candidates for the master of arts in counseling enroll for a common departmental core during the first semester of study. Selection of an area for concentration is made at the beginning of the second semester; this area governs the choice of courses for the balance of the graduate program. All applicants must comply with University requirements, the College of Human Resources and Education requirements, and departmental requirements.

Students are encouraged to pursue their studies on a full-time basis; however, part-time students are accepted. Counseling programs are available for both full-time and part-time students. An active summer program is available for part-time students. There are no summer practicum or internship placements.

Required Courses All students who are candidates for a master's in counseling are required to take the following core courses:

COUN 301 *Counseling Techniques*

COUN 305 *Theory and Practice of Human Appraisal*

ED P 320 *Introduction to Educational Research*

COUN 306 *Counseling Theories*

COUN 308 *Organization of School Guidance Services**

COUN 309 *Group Counseling Theory & Techniques*

COUN 320 *Lifespan Career Counseling*

COUN 322 *Community Counseling*

COUN 330 *Counseling Children*

COUN 332 *Counseling Adolescents and Adults*

COUN 334 *Cultural Issues*

COUN 340 *Addictions Counseling*

COUN 345 *Couples and Family Counseling*

COUN 385 *Practicum*

COUN 386 *Counseling Internship*

* Courses required for school counselor certification only. A special school counselor certificate is available for individuals without a teaching background. The program includes an additional nine hours of course work.

Please note: Doctoral level courses in counseling have the prefix CPSY

Application Applications for admission to the counseling program should be made to West Virginia University, Office of Admissions and Records. In addition to the admission requirements of the University and the College of Human Resources and Education, the Department of Counseling, Rehabilitation Counseling, and Counseling Psychology has the following admission requirements.

- A baccalaureate degree with course work in appropriate areas.
- A minimum undergraduate grade-point average of 2.8, based on a 4.0 system.
- GRE scores—a recommended total score of 900.
- Three letters of reference.
- Completion of the application to the counseling program.

The initial screening decision is based upon this information. Successful applicants are then interviewed by program faculty. Final decisions about admission are based on both the requirements and the interview process. Of the two steps in the process, the grade-point average and interpersonal skills demonstrated during the interview have the greatest input into the admission decision process.

Admission The West Virginia University Counseling Department's admission process is a two-step procedure. Step 1 is a review of paper credentials including references, department application (relevant major, general quality of application), work experience, GRE scores, and GPA.

Step 2 is the department interview, which considers interpersonal style relevant to working as a counselor, communication skills, capacity for empathic understanding and communication, ability to articulate professional goals, goals congruent with department focus, knowledge and understanding of counseling, assessment of applicants' capacity to complete the counseling curriculum successfully.

Application deadline for summer and fall admission is March 15; deadline for spring admission is October 15.

Counseling provides a broad opportunity to work with children at the elementary-school level, adolescents at the secondary-school level, and adults in community agencies. The school counselor is involved in personal counseling, career guidance, vocational and educational counseling, family counseling, and consultation on classroom problems with teachers and administrators. Counselors must be equipped to work with both individuals and groups. Much of the school counselor's work is carried out in classrooms with teachers and students. The school counselor also is active in working with community agencies.

Degree Requirements Degree requirements include completion of the required counseling course work, including practicum and internship. A minimum of 48 hours of course work with a 3.0 grade-point average is required.

In addition to completing all course work and the practicum and internship satisfactorily, the candidate must demonstrate the ability to assume the responsibility required of a professional counselor and the personal characteristics and ethical standards essential to effective working relationships with others.

These personal characteristics are assessed during the clinical course work components of the program and during the field experience. Students who do not meet professional and clinical standards in these areas are provided feedback, and resources for remediation are recommended. In these cases, successful remediation is required as a prerequisite for successful program completion. Students who violate ACA ethical standards will be evaluated for possible dismissal from the program.

In reviewing the curriculum available in counseling, the applicant will note that much of the course work provides the background applicable for employment in general community agency work. Some graduates who do not take employment directly in school settings find opportunities as counselors in the fields of public welfare, mental health, drug and alcohol counseling, and corrections.

Seminars All students enrolled in the master of arts in counseling program are expected to attend continuing education/professional development training seminars. These seminars or workshops must be related to counseling. The counseling program will provide many of these activities. Students should check with their assigned advisor for seminar information.

Certification

Certification requirements in school counseling are the same as for the masters of arts in counseling, except as noted below:

- A minimum grade-point average of 3.0.
- Recommendation of the faculty.
- A valid professional teaching certificate at the level for which counseling and guidance endorsement is desired, or the completion of a nine-hour block of professional education course work and competency assessment in addition to the 48-hour master's degree program.
- Completion of the required pattern of certification courses. (Contact the department for this list.)
- Specialization area examination. Satisfactory performance is required for certification eligibility. This examination is administered under the auspices of the State Department of Education.

Doctor of Philosophy

All applicants must comply with the graduate requirements of the College of Human Resources and Education and the program of counseling psychology. The program includes course work hours in addition to the College of Human Resources and Education requirements for the Ph.D. degree.

The area of specialization for the doctoral degree is oriented primarily toward training practitioners/scientists who have a substantial background in the philosophy and methods of psychology as a comprehensive science. Students are expected to work closely with faculty in doing research and in supervised therapy practice. Successful completion of the program requires core coursework in counseling psychology, as well as in foundations of psychology, statistics and research, and supervised practice. The program is fully accredited by the American Psychological Association (APA).

Admission The admission process is a two-stage procedure. Each spring, applications received by January 15th are reviewed for admission to the next academic year.

Applicants are screened based on written information and credentials provided to the admissions committee, including the following:

- Completion of a master's degree in an area related to counseling psychology.
- Graduate grade-point average of 3.5, verified by official transcripts of graduate course work.
- Three letters of recommendation to support applicant's competency in counseling, testing, research, and personal qualities of readiness for completion of a doctoral degree.
- A recommended total score of at least 1,000 on the Graduate Record Examination.
- Two years of relevant work experience is desirable.

Those persons who are successful in the Stage I process are invited to campus for a personal interview with the program faculty. The personal interview is required for a final admission decision. The interview helps to determine the applicant's interpersonal and clinical skills, which are predictive of success in graduate study, internship, and post-degree placement.

Announcements regarding admission are made before April 15. Materials received after January 15th are not reviewed until the following year, unless space is available.

Candidacy Students are accepted for study toward the Ph.D. degree upon admission into the programs. Requirements for doctoral candidacy are the following:

- Completion of prerequisite doctoral coursework with a 3.25 grade-point average.
- A written comprehensive examination of major areas in counseling psychology and research.
- Completion of an approved research prospectus.

Internship After admission to candidacy, students are eligible to enroll in internship. The internship is a full-time calendar year in an off-campus APA accredited training site approved by the director of training. After successful completion of the internship and the research dissertation, students take a final oral examination regarding their dissertation research.

Educational Theory and Practice with Emphasis in Curriculum Instruction

Doctor of Education

The curriculum and instruction area of specialization for the doctoral degree is designed to prepare candidates to teach at college or university levels, work with school districts or other agencies in curriculum areas, or to hold leadership positions in organizations that emphasize teaching and learning. Program flexibility allows candidates to design programs that meet their career goals. All programs are approved by an advisor and faculty committee.

The program requires a minimum of 72 hours beyond the baccalaureate degree, including 42 hours beyond a master's degree. In addition, the completion of a major in curriculum and instruction, an area of specialization, a core of foundations and research courses, successful completion of a comprehensive examination, and an approved dissertation are mandatory.

Admission All applicants must comply with the requirements of WVU, the College of Human Resources and Education, and the Curriculum and Instruction emphasis area program. Entrance requirements for the Curriculum and Instruction area of entrance for the Ed.D. are as follows:

- Completion of a master's degree; preferably in a curriculum or instruction area.
- Graduate grade-point average of 3.25 or higher.
- A goals statement that describes the extent to which the applicant's goals may be accomplished through the program.
- Three letters of references.
- Total GRE score of 1500 or above with a minimum score of 400 on each part (Verbal, Quantitative, and Analytic), or a Miller Analogies Test score of 50 or above. International students from a country in which English is not the native language must have a TOEFL score of at least 550.

Applications are reviewed and admission recommendations are made by the Programs Doctoral Admissions Committee. The number of students accepted into the program in each admission period is determined by available resources.

Candidacy Students are accepted for study toward the Ed.D. with an emphasis in curriculum and instruction upon admission into the program. To advance to candidacy for the doctorate, the student must:

- Complete prerequisite doctoral program coursework with at least a 3.0 grade-point average.
- Pass a written comprehensive examination, and
- Have a research prospectus approved by his or her dissertation committee.

Inquiries

For additional information concerning program requirements, deadlines, and timelines please direct inquiries to the Chair of Educational Theory and Practice, 602 Allen Hall, College of Human Resources and Education, West Virginia University, P.O. Box 6122, Morgantown, WV 26506-6122 or by phone (304) 293-3441.

Counseling (COUN)

216. *Behavior Problems and the School*. II, 3 HR. A course primarily oriented toward assisting educators utilize current psychological principles related to classroom discipline, as well as academic and social adjustment.

283. *Workshop in Counseling and Guidance*. I, II, S. 1-12 HR. PR: Consent. To take care of credits for special workshops and short intensive limit courses on methods, supervision, and other special topics.

301. *Counseling Techniques*. I, II, S. 3 HR. PR: Consent. Development and application of basic counseling skills including interviewing, clinical observation, and a general orientation to counseling settings. Evaluation will be based on strengths and deficits in intra- and interpersonal skills and on demonstration of counseling skills in checkout situations. In-setting laboratory experience required.

305. *Theory and Practice of Human Appraisal*. I, II, S. 3 HR. An overview of standardized evaluation methods commonly utilized in educational and rehabilitation settings. Experience is provided in selection, administration, and interpretation of selected instruments.

306. *Counseling Theories*. II, S. 3 HR. PR: COUN 301 and consent. A study of counseling approaches commonly used in public schools, colleges, and rehabilitation agencies. Application of theory emphasized.

308. *Organization/Development: School Guidance Services*. I, S. 3 HR. PR: COUN 305, COUN 306, COUN 320, and consent. Design and conduct of a school needs assessment, development of an annual guidance program, and review of current professional legal issues.

309. *Group Counseling Theory and Techniques*. I, II, S. 3 HR. PR: COUN 306 and consent. Theories of group counseling and demonstrations of specific group techniques. Evaluation will be based on expertise in group facilitation.

320. *Lifespan Career Counseling*. II, S. 3 HR. PR: COUN 305. Principles and methods involved in career counseling with diverse populations. Emphasis on theories of career development and life-style planning, career choices, and lifelong work adjustment.

322. *Community Counseling*. II, S. 3 HR. PR: COUN 301, 306 or conc. enrollment in 306, 320 or consent. Roles and functions of the community agency counselor; cognitive skills and practical experience necessary to understand client populations served by community agencies.

330. *Counseling Children*. I, S. 3 HR. PR: COUN 301, 306 or enrolled in 306 and consent. Practical application of the principles of guidance to the elementary school.

332. *Counseling Adolescents and Adults*. II, S. 3 HR. PR: COUN 301, 306 or enrolled in 306 or consent. Techniques and models that apply to the counseling of adolescents and adults will be explored. Emphasis will be given to stages of adolescent and adult development and implications for behavior. Demonstration of counseling with adolescents and adults is required.

334. *Cultural Issues*. II, S. 3 HR. PR: COUN 301, 306 or conc. enrollment in 306 or consent. Impact of cultural differences on the counseling process; gender, race, ethnicity, socioeconomic status, counseling styles and cross cultural counseling methods; group and experimental activities are required.

340. *Addictions Counseling*. II, S. 3 HR. PR: COUN 301, 306 or enrolled in 306 or consent. Specific techniques and models that apply to counseling the addicted client will be explored. Chemical addictions, food addictions, relationship addictions, and sexual addictions will be addressed. Demonstration of counseling clients with various addictions is required.

345. *Couples and Family Counseling*. I, S. 3 HR. PR: COUN 301, 306 or consent. Techniques and methods of couples and family counseling will be covered. Emphasis will be on both the theories and practice of couples and family counseling. Demonstration of counseling skills for couples and families is required.

382. *Special Topics*. I, II, S. 1-6 HR. PR: Advanced standing and consent. Independent study and directed readings in specialized areas of counseling and guidance. (Some sections of COUN 382 have prerequisite requirements. Check with the instructor.)

385. *Practicum*. I, II, S. 1-12 HR. PR: Preregistration; liability insurance; cleared for internship at close of semester, or M.A. degree, and consent of department practicum evaluation committee. An intensive supervised practical experience in public schools or agencies, in counseling with individual critique and appropriate small-group experiences. Demonstration of high professional standards, counseling skills, and personal characteristics appropriate to the counseling relationship are essential. (Due to the limited number of summer sites, there can be no guarantee of summer practicum placement.) [Practicum is a prerequisite for internship placement. Internship is a one-semester, minimum four-day per week field experience following practicum. This two-semester sequence replaces the previous one-semester practicum.]

386. *Counseling Internship*. I, II, 1-12 HR. PR: Preregistration, completion of COUN 385 (Practicum) and consent of department field work coordinator. A full-time supervised field experience. Demonstration of counseling program management skills and ethical conduct is required-ACA Ethical Behavior Standards will be used to determine appropriate professional conduct.

391. *Advanced Topics*. I, II, S. 1-6 HR.

395. *Problem in Counseling and Guidance*. I, II, S. 1-12 HR. PR: Consent. Study and research for master's degree in counseling and guidance.

Counseling Psychology (CPSY)

401. *Advanced Counseling Psychology Techniques*. I. 3 HR. PR: Advanced standing, COUN 301, COUN 306, and COUN 385 or equiv., and consent. Comprehensive development of counseling psychology techniques related to generic and specific theoretical models. In-setting laboratory experience and demonstration of therapy techniques required.

409. *Advanced Group Counseling/Therapeutic Techniques*. 3 HR. PR: COUN 309 or equiv. and consent. An overview of the formation, leadership techniques, research and ethical issues associated with group counseling and psychotherapy in general and for specific populations. Lecture.

431. *Advanced Consultation Techniques*. I. 3 HR. PR: COUN 331 or equiv., or consent. Multiple training and experiences in theories and techniques of consultation and delivery of human services to educational and community personnel. Simulated classroom and laboratory experiences.

460. *Introduction to Counseling Psychology*. 3 HR. PR: Consent. Overview of the history, current status and future trends associated with Counseling Psychology as a specialty area. Includes an introduction to counseling psychology research topics and practices.

463. *Advanced Theories of Counseling Psychology*. II, S. 3 HR. PR: COUN 306 and 385, or equiv., admission to post-master's graduate study; and consent. A comprehensive study of the theoretical issues in contemporary counseling.

460. *Introduction to Counseling Psychology*. 3 HR. PR: Consent. Overview of the history, current status and future trends associated with counseling psychology as a specialty area. Includes an introduction to counseling psychology research topics and practices.

463. *Advanced Theories of Counseling Psychology*. II, S. 3 HR. PR: COUN 306 and 385, or equiv., admission to post-master's graduate study; and consent. A comprehensive study of the theoretical issues in contemporary counseling.

464. *Intellectual Assessment*. II, 4 HR. PR: Advanced standing, COUN 305, and preregistrations with instructor. Administering, scoring, and interpreting individual intelligence tests.

466. *Vocational Psychology*. II, 3 HR. PR: COUN 320 or equiv., advanced standing or consent. Advanced study of theory development and research in vocational psychology and counseling; emphasis on counseling psychology, women's issues, and cross-cultural counseling.

469. *Personality Testing and Interpretation*. I, 3 HR. PR: COUN 305 and consent. Advanced study in the application of personality assessment procedures and consideration of alternative methods for measuring human behavior.

470. *Doctoral Practicum in Counseling Psychology*. 1-9 HR. CPSY 401, CPSY 469, and CPSY 480 or equiv. and completed doctoral practicum application (due by March 1 of semester year preceding initial semester), and consent. Intensive clinical experience in which students, under supervision, see clients for individual and group counseling and psychotherapy. Offered at a variety of approved field-based sites. (Practicum.)

472. *Internship*. I, II, S. 1-12 HR. PR: Written approval from the Department Internship Committee, satisfactory completion of written doctoral comprehensive exams and approval of research prospectus. Full-time supervised practice in an approved counseling psychology internship training program; minimum duration one academic year.

480. *Professional and Ethical Issues in Counseling Psychology*. II, 3 HR. PR: Advanced standing and consent. Overview of current ethical, legal, and professional issues in counseling psychology. Readings, discussion, and a written literature review of a topic related to the practice of counseling psychology.

483. *Counseling Psychology Supervision Model*. I, 3 HR. PR: CPSY 401, 480, and at least one semester of CPSY 470 or equiv., and consent. Overview of major assumptions and techniques of major counseling supervision models. Training activities include simulated and actual demonstrations each of the supervision models and critique of their assumptions, advantages, and constraints.

482. *Research Practicum in Counseling Psychology*. 1-6 HR. PR: Consent. The conduct of a descriptive or an experimental study. An overview of research design, statistical procedures, potential violations of ethical principles in the conduct of research. 1-6 HR. practicum.

483. *Counseling Psychology Supervision Models*. I, 3 HR. PR: CPSY 401, 480, and at least one semester of CPSY 470 or equiv., and consent. Overview of major assumptions and techniques of major counseling supervision models. Training activities include simulated and actual demonstrations of each of the supervision models and critique of their assumptions, advantages, and constraints.

490. *Teaching Practicum*. I, II, 1-3 HR. PR: Consent. Intended for graduate students with college teaching responsibility in counseling psychology.

491. *Advanced Study*. I, II, S. 1-6 HR. PR: Consent. Investigation in advanced areas of Counseling and Counseling Psychology counseling.

492. *Directed Study*. I, II, 1-6 hr, PR: Consent.

496. *Graduate Seminar*. I, 1 HR. PR: Advanced standing and consent. Seminar in counseling psychology including written and oral presentation of methodology and results of one's own research study with supervision and critique by the instructor and members of the seminar.

497. *Research*. I, II, S. 1-15 HR. per semester. PR: Consent. Dissertation.

498. *Thesis*. I, II, S. 2-4 HR. PR: Consent.

499. *Graduate Colloquium*. I, II, S. 1-6 HR. PR: Consent. For graduate students not registered in regular course work but who have need to use University facilities for completion of their research or program.

Educational Leadership Studies

David L. McCrory
509 Allen Hall

Degrees Offered:

Master of Arts

Area of emphasis for Doctor of Education

The Educational Leadership Studies program at West Virginia University prepares individuals for leadership positions in elementary, secondary, and post-secondary educational institutions. While most EDLS students pursue administrative careers, some prepare for college or university research, teaching and/or staff positions. The EDLS Program Unit offers graduate programs leading to the master of arts degree and the doctorate degree in education with emphasis in public school or higher education leadership. In addition, programs leading to certification for elementary and secondary principals, instructional supervisors and superintendents are provided.

Admission

Students who possess a baccalaureate degree from a college or university, have earned at least a grade-point average of 2.75 on a scale of 4.0, and have met all the criteria established by the program emphasis area may apply for regular admission to graduate study in the educational leadership program. To apply, students submit an application for admission, all college transcripts, and a nonrefundable service fee to the Office of Admissions and Records, West Virginia University, PO Box 6009, Morgantown, WV 26506-6009. Phone: 304-293-2121, Fax: 304-293-3080. The Office of Admissions and Records verifies information and forwards applications to the academic unit. Admissions decisions are made at least three times during the academic year, once each semester and once during the summer. Please contact the EDLS program secretary for specific admissions dates.

Students not wishing to pursue an advanced degree may apply for admission as non-degree graduate students. Applicants must complete the standard application form, pay the nonrefundable special service fee, state the area of intended study and present evidence of a baccalaureate degree. No one, however, can pursue an advanced degree at WVU unless admitted to the regular degree program. **Under no circumstances may a non-degree student apply more than 12 hours of credit earned while he or she was classified as a non-degree student toward a degree.**

These minimum standards for admission to graduate study are set by the University Graduate Council. Beyond this point, however, faculty members in the graduate program have control over who is admitted to undertake graduate study under their supervision; and ultimately it is they who certify which students have demonstrated sufficient mastery of the discipline to qualify for a graduate degree. While a student may be admitted for the purpose of enrolling in advanced course work, only the program faculty may grant permission for the pursuit of a degree. Likewise, a student will not be recommended for a degree until the graduate faculty of a program has indicated in writing that the student has gained the desired knowledge.

The course of study for the doctoral degree may be completed through regular on-campus classes, as regular on-campus classes, or within the cooperative doctoral program classes offered jointly by WVU faculty and faculty at Marshall University Graduate College. Students selecting the regular on-campus program design their individual courses of study conjointly with their advisors and their dissertation committees. Students selecting the Cohort Program must complete their programs of study as members of the cohort group to which they are admitted. Students selecting the Cooperative Doctoral Program complete the major portion of their coursework at off-site locations in Charleston and Huntington. Information about each of these program options is available from the EDLS program coordinator, the program secretary, or from individual EDLS faculty members.

Programs

Optional programs are available in public school administration and supervision, higher education leadership, and adult and continuing education. A two-semester, field-based experience is required before permanent professional certification can be acquired in public school leadership and supervision. In order to graduate, the student must earn at least a 3.25 grade-point average on all program work attempted. Students seeking West Virginia certification must pass a West Virginia Department of Education content specialization examination upon completion of their academic program.

Doctor of Education Degree

The doctor of education degree is offered with tracks in public school administration, higher education, and related educational organizations (such as state departments of education). Consistent with the regulations of the University, the College of Human Resources and Education, and the program of educational leadership, each track is individually designed by the doctoral student, the student's advisor, and the doctoral committee.

Educational Leadership Studies (ED A)

300. *Public School Organization and Administration*. 3 HR. Basic concepts through which administrators, supervisors, and teachers gain understanding of general problems related to operation of schools and school systems.

318. *School Business Administration*. 3 HR. PR: Consent. Sound business administration for central office school administrators. Microcomputer competency in IBM compatible word processing, data base, and spreadsheet applications required prior to course completion.

320. *Human Resources Management*. 3 HR. PR: Consent. The determination of student, employee, and organizational personnel needs and the development of plans and programs to meet these needs.

330. *Principles of Educational Leadership*. 3 HR. PR: Consent. Problems of school leaders in the areas of administration, supervision, and instruction.

331. *Principles of Supervision*. 3 HR. PR: Consent. Elementary, junior high, and senior high supervision

333. *School Law*. 3 HR. PR: Consent. Overview of the generally accepted legal principles which affect the student, teacher, and principal in a public school setting.

334. *College Student and the Courts*. 3 HR. PR: Consent. A study of the major areas of higher education law from the perspective of the college student. A case study approach.

335. *Introduction to College Student Personnel*. 3 HR. PR: Consent. A study of the organization and administrative functioning components, concepts, and models of student personnel administration systems using a historical and topical approach. Conceptual approach based upon the student development model.

336. *Fund-raising and Foundation Management*. 3-6 HR. PR: Consent. (Fall, even years) Studies in fund raising, alumni relations, and foundation management. (Also listed as JRL 312.)

337. *College Business Management*. 3 HR. Covers knowledge of such areas as budgeting, budget preparation and administration, resource reduction and reallocation, and grants/contracts preparation and administration.

338. *Higher Education Administration*. 3 HR. Key concepts of organization and administration within higher education institutions, concentrating primarily on the nonacademic components of the institutions, from the president to first-level supervisor.

339. *The College Student*. 3 HR. Review of research and literature on college students from freshman through graduate school. Emphasis on student subcultural patterns.

350. *Community College Administration*. 3 HR. An analysis of the historical/philosophical development of the community colleges movement in the U.S. A specific focus on developing an awareness and critical understanding of the administrative characteristics of the internal organizational components.

351. *Administrative Procedures in Adult Education*. 3 HR. PR: Consent. (Offered off-campus only.) Theories and principles of administering adult education organizations as they relate to planning, organizing, staffing, initiating, delegating, integrating, motivating, decision making, communicating, establishing standards, financing, budget defense and control, and measuring results.

352. *Professionalism in Extension Service*. 3 HR. PR: Consent. (Offered off-campus only.) Role of Extension Service professionals in social change; study of community systems, professional relationships, accountability, ethics, obligations to clientele.

353. *Community Education: Administration and Organization*. 3 HR. PR: Consent. Study of the rationale, methods, and procedures in administering and programming community education. Experiences in planning, adapting, and evaluating programs independently and in consort with school and community plans.

373. *Professional Development*. 1-6 HR. (May be repeated for credit.) PR: Department consent. Specially designed experiences for those interested in advancing professional skills in a particular specialty. (Not for degree credit in programs in the College of Human Resources and Education.)

380. *Topics in Supervision*. 3 HR. Special knowledge and skills for supervisors K-12 including media, computers, reading, multicultural education, testing, and special education.

385. *Practicum*. 1-12 HR. PR: Consent.

388. *Research-Evaluation-Assessment*. 3 HR. PR: Consent. Research, evaluation, and assessment procedures related to administrative decision making and problem solving to increase the general effectiveness of educational institutions.

389. *School-Community Relations*. 3 HR. PR: Consent. A study of the systems through which the school can be interpreted to its community.

391. *Advanced Topics*. 1-6 HR.

395. *Site Based Administration*. 3 HR. A study of the active role of principals in Early, Middle, and Adolescent schools. Specific emphasis is placed upon the areas of effective schools, instructional leadership, special services, and facilities management.

397. *Master's Degree Research or Theory*. 1-15 HR.

402. *Centreal Office Leadership*. 3 HR. PR: M.A. in education administration, or equiv., or consent. Roles, relationships, behaviors, and competencies which characterize the school superintendent and staff. (Offered in fall and summer of even years.)

403. *Education Administration Theory*. 3 HR. PR: M.A. in education administration, or equiv., or consent. Interdisciplinary study of the major concepts of education administration theory and the application to educational settings.

404. *Public Education Finance*. 3 HR. PR: M.A. in education administration, or equiv., or consent. Basic concepts. (Offered in spring of even years.)

405. *Administration of Educational Facilities*. 3 HR. PR: M.A. in education administration, or equiv., or consent. The planning, evaluation, and management of current and future school facilities.

406. *Public Education and the Law*. 3 HR. PR: M.A. in education administration or equiv., or consent. Legal permissives and limitations involved in setting policy for organization of and administration of public schools.

407. *Collective Bargaining in Public Education*. 3 HR. PR: M.A. in education administration, or equiv., or consent. This course is designed to inform school administrators about the concepts and principles of negotiating and implementing collective bargaining agreements.

408. *Organizational Analysis*. 3 HR. PR: M.A. in education administration, or equiv., or consent. An examination of alternative means for the analysis of organizational structures, interrelationships, and functions. A field analysis is required.

409. *Politics of Education*. 3 HR. PR: M.A. in education administration, or equiv., or consent. An examination of the internal political nature of school systems, and of the external influence of legislative, judicial, and administrative bodies and interest groups.

410. *Advanced Supervision*. 3 HR. PR: Consent. Exploring theories, research and practice of pre-service and in-service instructional supervision in the classrooms of novice and mature teachers. (Also listed as C&I 410.)

456. *Administration of Academic Affairs*. 3 HR. PR: Consent. Management, leadership, and administrative roles of academic affairs offices in colleges and universities including academic personnel, program definition, research and teaching issues, and other functions of academic oversight.

457. *Governance of Higher Education*. 3 HR. PR: Consent. Formulation and implementation of state master plans and the roles of state governing bodies in public and private institutions.

459. *Adult and Continuing Education*. 3 HR. Principles, concepts, and processes involved in programming for adults in a community setting. Nature of adult learning, subject matter, and learning environment.

460. *Development of Administration in American Higher Education*. 3 HR. The administrative development of American higher education from 1636 to the present, including internal trends and external forces.

462. *Higher Education Law*. 3 HR. Critical legal issues of higher education—public and private—using a case study approach.

463. *Higher Education Finance*. 3 HR. Financial concerns in higher education with emphasis on taxation and legislative actions, sources of income, budgeting, and cost analysis.

465. *Institutional Research and Planning*. 3 HR. Accumulation, analysis, and interpretation of data relevant to decision making and the allocation of institutional resources. (Offered in spring of even years.)

467. *Higher Education Collective Bargaining*. 3 HR. The process and content of collective bargaining in higher education and its impact on institutional governance and academic jurisdictions.

469. *Education Administration Internship*. 3-6 HR. (May be repeated for credit.) PR: Consent. Practical experiences in the administration of an organizational unit under the supervision of an administrator within the unit.

470. *Principal's Planned Field-Based Experience*. 3 HR. PR: Three years of successful experience as a teacher and have a position as principal or assistant principal. Consists of problem-solving techniques and seminar activities as applied to explicit problems in the professional environment. (Required for permanent certification as a principal.)

471. *Supervisor's Planned Field-Based Experience*. 3 HR. PR: Three years of teaching experience, 15 hours completed in a master's degree program, and be employed full-time as a supervisor. Consists of problem-solving techniques and seminar activities as applied to explicit problems in the professional environment. (Required for permanent certification as a supervisor.)

472. *Superintendent's Planned Field-Based Experience*. 3 HR. PR: Five years of successful experience as a teacher or supervisor, and employed as a superintendent or assistant superintendent. Consists of problem-solving techniques and seminar activities as applied to explicit problems in the professional environment. (Required for permanent certification as a superintendent.)

480. *Seminar*. 1-6 HR. PR: Consent.

485. *Special Topics*. 1-6 HR. PR: Consent.

491. *Advanced Study*. 1-6 HR. PR: Consent. Advanced subjects which are not covered in regularly scheduled courses. Study may be independent or through specially scheduled lectures.

496. *Doctoral Orientation Seminar*. I, 1-6 HR. Required for all new doctoral students.

497. *Research*. 1-15 HR. PR: Consent.

Educational Psychology

David L. McCrory
509 Allen Hall

Degree Offered:

Master of Arts, Area of emphasis for Doctor of Education

Master of Arts

The educational psychology program in the College of Human Resources and Education offers opportunities for graduate study and research leading to the master of arts. Professional preparation focuses on learning and development, instruction and research. Accordingly, students are expected to achieve competencies in these areas.

Programs are planned jointly by the student and the student's advisor to meet particular career needs. Minor fields of study are also planned for each student as appropriate. In addition to the general requirements of the University and the College of Human Resources and Education, the department requires a core of courses and supporting competencies of all graduate students.

Educational psychologists function in a variety of settings. The program prepares and places competent educational psychologists in educational settings at all levels, such as educational agencies at local, state, and federal levels; public and private human service centers; medical centers; and business and industrial settings.

All applicants must comply with the general requirements of the University and the College of Human Resources and Education. The applicant must have an undergraduate degree from an accredited institution and must submit official transcripts of the undergraduate work, the official scores for either the Graduate Record Examination (GRE) or the Miller Analogies Test (MAT), a 500-word, written goal statement, a personal vita, and three letters of reference.

Core Each student is expected to complete the following core of courses as part of the master's plan of studies:

- ED P 300 *Advanced Educational Psychology*
- ED P 311 *Statistical Methods 1*
- ED P 330 *Foundations of Educational Measurement*
- ED P 350 *Applied Behavior Analysis*

The master's requires a minimum of 30 hours of course work including the completion and successful defense of a thesis or the completion of 30 hours of course work including the completion of a problem. Those students who plan to pursue a doctorate are required to take the thesis option.

Application Criteria The credentials for all applicants are screened by a three-member admissions committee of the department. The criteria used as guidelines for evaluating applicants are:

- Total GRE scores of 1,100 or higher or MAT score of 55 or higher; international students from a country in which English is not the native language must have a TOEFL score of at least 550 and a combined total score of at least 1000 on the GRE verbal and the TOEFL.
- An undergraduate GPA of at least 3.0.
- A graduate GPA of 3.25 or higher for graduate work completed to date.
- The extent to which the applicant's goals and objectives may be accomplished if admitted to the program.
- Favorable recommendations and appropriate background experiences.

Good Standing To remain in good standing, a student must have an average grade of B or better for all courses in the program and make satisfactory progress toward the completion of the program competencies (as described in the following section).

Doctor of Education

The doctor of education requires a minimum of 72 hours of graduate credit beyond a bachelor's degree or 42 hours beyond a master's degree. In addition, completion of a core of required courses, fulfillment of competency requirements, and an approved dissertation are mandatory.

Each student is expected to complete the following core courses as part of the doctoral plan of studies:

ED P 301 *Introductory Behavior Analysis: Human Resources*

ED P 440 *Human Development and Behavior*

ED P 451 *Principles of Instruction*

ED P 480 *Research in Education* (PR: ED P 311)

The student is also expected to enroll in a doctoral seminar, ED P 494, for two semesters for in-depth coverage of specialized content issues in educational psychology.

Competency Areas There are three competency areas in the program: learning and development, instruction, and research. Students are expected to fulfill the program competency requirements by meeting the goals and objectives specified for the program. The learning and development competency product will take the form of a theoretical paper, the instruction competency product will be a course or other type of instructional sequence of comparable magnitude, and the research competency product will be a data-based research paper of publishable quality.

Inquiries should be addressed to the Coordinator of Educational Psychology, Allen Hall, College of Human Resources and Education, West Virginia University, P.O. Box 6122, Morgantown, WV 26506-6122.

Educational Psychology (ED P)

190. *Teaching Practicum*. 1-3 HR.

191. *Special Topics*. 1-3 HR.

206. *Development for Teachers*. I, II. 3 HR. PR: EDUC 100. Cognitive, social, emotional, and physical development of children and young adolescents with application to school settings.

260. *Media and Microcomputers in Instruction*. I, II, S. 3 HR. The effective operation and educational uses of educational media including microcomputers. Hands-on experience with equipment, and in designing materials for an instructional unit incorporating media and/or microcomputers.

269. *Human Behavior: Science & Technology*. I, II. 4 HR. Comprehensive introduction to the natural science of human behavior. Detection and analysis of behavior/environment functional relations. Scientific description, measurement, and analyses of various behaviors. Scientific reinterpretation of human phenomena. Practical behavior-related projects.

300. *Educational Psychology*. I, II, S. 3 HR. Designed for beginning graduate students. Psychological principles of learning and development as they relate to processes of instruction.

301. *Introductory Behavior Analysis: Human Resources*. I. 3 HR. Introduction to behavior analysis in education and human resources. Basic practice in measuring and shaping human behavior. A comprehensive examination of relationships among human organisms, environment, and behavior.

311. *Statistical Methods 1*. I, S. 3 HR. PR: MATH 3. Basic concepts of statistical models, distributions, probability, random variables, tests of hypotheses, confidence intervals, regressions, correlation, transformation, F and chi-square distributions, analysis of variance and sample size.

312. *Statistical Methods 2*. II, 3 HR. PR: STAT 311. Extension of basic concepts of statistical models, design of experiments, multiway classification models, factorials, split plot design, simple covariance, orthogonal comparisons, multiple linear and nonlinear regression and correlation analysis, chi-square and nonparametric statistics.

320. *Introduction to Research*. I, II, S. 3 HR. Basic concepts, strategies, methodologies, designs, and procedures of research in education. Major emphasis on integrating research designs, measurements, and statistics for initiating research projects, collecting and analyzing data, and interpreting and reporting findings.

321. *Audio Visual Resource Instruction*. 3 HR.

330. *Measurement and Assessment*. I, II, S. 3 HR. An examination and application of norm-referenced and criterion-referenced principles and procedures to the measurement and prediction of learner performance.

333. *Non-parametric Statistics*. 3 HR.

341. *Multivariate Methods 1*. (Alternate years.) 3 HR. PR: STAT 311 or equivalent. Basic matrix operations, multiple regression analysis, discriminant analysis for two groups, multivariate analysis if variance for one-and two-way designs, and analysis of covariance involving multiple covariates. Applying SAS Procedure Matrix for data analyses.

342. *Multivariate Methods 2*. (Alternate years.) 3 HR. PR: STAT 311 or equivalent. Matrix operations, multivariate multiple regression analysis, canonical correlation analysis, discriminant analysis for multiple groups, qualitative discriminant analysis applying Bayes' theorem, principle component analysis, and fundamentals of common factor analysis. Data analyses with SAS Procedure Matrix.

343. *Statistical Analysis in Education*. 3 HR. PR: EDP 330 or consent. Review measures of central tendency, percentiles, and correlation. Emphasis placed on correlation, regression, testing hypothesis, nonparametric tests, and other measures in analysis and inference.

350. *Applied Behavior Analysis*. I. 3 HR. PR: EDP 301 or equivalent. Application of reinforcement theory as an instructional technique in changing human behavior. Analysis of problems in terms of behavior and the design of instruction and treatment programs to produce desired change.

351. *Instructional Design*. I. 3 HR. PR: Graduate Standing. Introduces the major components of the instructional design process, from needs analysis through evaluation and implementation. Students will demonstrate the elements of the process with a design plan for an instructional project.

355. *Cognition and Strategic Learning*. II. 3 HR. Theories of knowledge representation including information processing models, learning strategies across content areas and transfer of learning strategies; additional focus on problem-solving, expertise, strategic reading, and strategy instruction.

359. *Conceptual Foundations of Behavior Analysis*. 3 HR. Comprehensive introduction to the basic science of human behavior and its philosophy. Provides a conceptual frame-work for a variety of applied fields.

360. *Behavioral Analysis Teaching and Training Systems*. 3 HR.

385. *Practicum*. I, II, S. 1-12 HR. PR: Consent.

391. *Advanced Topics*. I, II, S. 1-6 HR.

397. *Research*. I, II, S. 1-15 HR.

400. *Verbal Behavior 1*. (Alternate years.) 3 HR. PR: EDP 350 or consent. Behavioral analysis of complex verbal behavior in person-to-person contacts in text materials and in instructional systems.

420. *Seminar: Educational Research*. I, II. 3 HR. PR: EDP 311 and consent. Identification of research problems in education, consideration of alternative designs and methods of investigations, and development of a research proposal at the advanced graduate level.

423. *Designing Single Case Research*. I. 3 HR. Measurement and design tactics for research with one or a small number of participants allowing the researcher to identify effective practices for individual students or clients.
440. *Human Development and Behavior*. I. 3 HR. Contemporary psychological literature on human development examined and analyzed. Research and theory are examined with emphasis on the implications for classroom behavior and the educational process.
450. *Psychological Foundations of Learning*. I, S. 3 HR. Psychological foundations of major learning theories and their implications for instructional procedures.
451. *Principles of Instruction*. II. 3 HR. PR: Consent. Basic principles of teaching-learning process implied in major learning theories; study of factors in learning, variables in instructional program, and principles of instructional design.
454. *Memory*. II. 3 HR. Short-term, memory, long-term memory, memory networks, and memory problems as they relate to school learning, strategies for instruction, and lifelong adaptation in a dynamic society.
455. *Cognition in Social Contexts*. I. 3 HR. PR: EDP 355 and EDP 454 or consent. Application of social learning theory in current literature and practice. Emphasis on theory in application in cooperative and group learning situations.
456. *Interactive Technologies in Education*. I. (Alternate years.) 3 HR. PR: Consent. Principles of human cognition a basis for electronic tools; problem solving software, multimedia, intelligent tutoring systems, distance learning; active/generative learning, knowledge construction, interdisciplinary learning, multiple knowledge representations, and educational reform.
480. *Seminar in Educational Psychology*. I, II, S. 1-6 HR. PR: Consent.
481. *Special Topics in Educational Psychology*. I, II, S. 1-6 HR. PR: Consent.
490. *Teaching Practicum*. I, II. 1-3 HR. PR: Consent. Intended for graduate students with college teaching responsibility. Provides a supervised experience for graduate students in a teaching situation.
491. *Advanced Study*. I, II, S. 1-6 HR. PR: Consent. Investigation in advanced areas of educational psychology.
492. *Directed Study*. 1-6 HR. Directed study, reading, and/or research.
494. *Special Seminars*. 1-6 HR. Special seminars arranged for advanced graduate students.
495. *Independent Study*. 1-6 HR. Faculty supervised study not available through regular course offerings.
496. *Graduate Seminar*. I, II. 1 HR. PR: Consent. Designed to permit graduate students an opportunity to present research to the assembled faculty and the graduate student body.
497. *Research*. I, II, S. 1-15 HR. PR: Consent. Dissertation.
498. *Thesis*. I, II, S. 2-4 HR. PR: Consent.

Elementary Education

R. Jerrald Shive, Department Chairperson, Educational Theory and Practice
602 Allen Hall

Degree Offered:
Master of Arts

Master of Arts

The Department of Educational Theory and Practice provides opportunities for graduate study and research leading to the degree of master of arts (M.A.) for educators and other professionals with educational responsibilities. The primary purpose of the masters program in elementary (early/middle) education is to provide increased knowledge, skill, and competence for licensed teachers working with children in the elementary (early/middle) school setting. The graduate elementary (early/middle) teacher education program has three major areas of emphasis: general education, subject area/grade level, curriculum and methods, and electives.

These emphases are planned jointly by the student, the student's advisor, and the student's committee to meet the career needs of the student. In addition to the general requirements of the University and the College of Human Resources and Education, there is a core of courses or course areas and supporting competencies required of all graduate students in the department.

The purpose of the program is to prepare master teachers who work with children from nursery through elementary school. The program provides the opportunity to specialize in early childhood, middle childhood, or a subject area. With advisor approval, electives may be selected that enhance the student's personal goals.

For further information on admission and program requirements, write Chairperson of Educational Theory and Practice, College of Human Resources and Education, 602 Allen Hall, P.O. Box 6122, Morgantown, WV 26506-6122.

Requirements All applicants must comply with the general requirements of the University and the College of Human Resources and Education.

Required Courses	Hours		
	Program A*	B**	C***
C&I 301	3	3	3
C&I 330	3	3	3
C&I 340	3	3	3
C&I 350	3	3	3
C&I 388	0	0	3
C&I 391	0	3	0
C&I 497	6	0	0
ED F 320 or 340	3	3	3
ED P 320	3	3	0
ED P 300 or 330	3	3	3
RDNG 321, or 323, or 327, or 330 ...	3	3	3
Total Required Courses	30	27	24
General Education Electives	0	3	12
(All elective courses must be approved by the advisor before enrollment.)			
Total for Master's Degree	30	30	36

Emphasis: Early Childhood Education (Pre K-4)

Required Courses	Hours		
	Program A*	B**	C***
C&I 312	3	3	3
C&I 314	3	3	3
C&I 316	3	3	3
C&I 391	0	3	0
C&I 497	6	0	0
C&I 317 or RDNG 323	3	3	3
CDFS 341 or approved elective	3	3	3
ED P 320	3	3	0
ED P 330	3	3	3
Total Required Courses	27	24	18
Approved Electives			
Restricted Electives in			
Early Childhood Education	3	3	3
Supportive Electives in Education	0	3	15
(All elective courses must be approved by the advisor before enrollment.)			
Total for Master's Degree	30	30	36

*Program A—Thesis required.

**Program B—Research problem required.

***Program C—36-semester hour course work program.

New requirements for the master's degree in elementary education are now being developed. Information concerning any new degree requirements will be available from the Department of Educational Theory and Practice.

Curriculum and Instruction (C&I)

210. *Early Childhood Education 1*. I, II, S. 3 HR. PR: CDFS 216. An introduction to curriculum objectives, instructional methods and materials, and evaluation in early childhood education. (Pre-K to 4th grade) that includes a field experience with individualized instruction for one child.

211. *Early Childhood Education 2*. I, II, S. 3 HR. PR: C&I 210. This course is designed for individuals who will be working in early childhood education Pre-K to 4th Grade. Topics include: working with families of young children; designing, teaching and evaluating experiential lessons for small group of children; and gathering and assessing developmental data on small groups of children. A semester-long field experience with a class of young children is required.

212. *Methods in Preschool Education*. I. 3 HR. PR: EDUC 100 or equiv. Development of an experiential model of teaching young children. Application of methods in basic needs areas of nursery-early childhood education consistent with an experiential model of teaching.

214. *Creative Experiences in Early Childhood*. II. 3 HR. PR: EDUC 100 or equiv. Examination of creative experiences for young children and their relationship to child development. A special focus on play behavior as a learning medium with emphasis on program planning, curriculum development, and instructional strategies.

216. *Early Language and Communication Experiences*. I. 3 HR. PR: EDUC 100 or equiv. Presents activities for developing language and communication skills in children 2-5 years of age. Covers a broad range of temporary and enduring forms of communication in visible and audible media.

218. *Management of Preschool Education*. II. (Alternate Years.) 3 HR. PR: EDUC 100 or equiv. (A field experience with children 2-5 years of age is required.) Planning, designing, and assessing programs for children ages 2-5 years with emphasis on management skills.

224. *Approaches to Teaching Language*. II. 2 HR. PR: LING 1 and ENGL 2. Designed for prospective teachers of English and language arts. Focus is upon planning and implementing methods of teaching English as a language. Materials and resources appropriate for public school instruction are analyzed and utilized.

225. *Approaches to Teaching Language*. II. 2 HR. PR: Junior standing. Designed for prospective teachers of English and language arts. Course focuses upon methodologies for teaching literature in public schools. Workshop format will provide opportunities for peer teaching activities as students apply methods of teaching literature.

280. *Special Problems and Workshops*. I, II, S. 2-4 HR. (Maximum of 8 semester hours may be applied toward the master's degree.) PR: 14 HR. in education. Credits for special workshops and short intensive unit courses on methods, supervision, and other special topics.

287. *Advanced Clinical Experience*. I, II, S. 1-6 HR. PR: Consent. Clinical experience in teaching-learning situations at any level.

300. *U.S. Education for International Students*. I. 3 HR. PR: International students with graduate status and developing oral and written English skills. To assist international students in understanding the U.S. system of education. Included: dominant U.S. values related to education; structure of U.S. education at all levels; models and strategies; field trips; international comparisons.

301. *The Elementary-School Curriculum*. I, II, S. 3 HR. PR: 20 hours of undergraduate credit in elementary education, or consent. Analysis of curriculum designs in elementary education with emphasis on methods and techniques of development.

304. *The Secondary School Curriculum*. I, II, S. 3 HR. PR: High-school teaching experience or consent. Emphasizes socioeconomic and cultural influences on the curriculum; principles of curriculum development; curriculum building in the various teaching fields; techniques of experimentation and evaluation; and practice in curriculum building with special emphasis on unit construction.

306. *Curriculum for Middle Childhood*. I, S. 3 HR. Survey course which includes: historical, social, and cultural influences on the curriculum; the learner characteristics; curriculum and instructional organization and their relationship to facilities available; evaluation and implementation of middle childhood curriculum.

308. *Introduction to Alternative Learning Environments*. I. 3 HR. This course will provide opportunities for educators to explore and analyze the trends and issues in alternative learning environments in public education. public education.

309. *Experiences in Alternative Learning Environments*. I. (Alternate years.) 6 HR. PR: C&I 308, EDF 320, and consent. This course helps teachers to learn and practice skills that are needed to be an effective teacher in an alternative teaching environment.

312. *Early Childhood Curriculum*. 1. 3 HR. PR: (C&I 210 and C&I 211) or consent. Curriculum development for early childhood education Pre-K to 4th Grade, including social, creative, cognitive, physical, and academic goals. Societal, historical, and theoretical influences on early childhood curriculum are examined.

314. *Early Childhood Instruction*. I, II. 3 HR. PR: (C&I 210 and C&I 211) or consent. Design of instruction for continuous improvement toward mastery of curriculum goals for early childhood education Pre-K to 4th grade.

316. *Early Childhood Program Development and Evaluation*. I. 3 HR. PR: (C&I 210 and C&I 211) or consent. Development, administration, and evaluation of facilities, programs, and support systems for early childhood education Pre-K to 4th grade. Includes a focus on family connections and support systems related to early childhood classrooms.

317. *Language Arts in Early Childhood*. I, II. 3 HR. PR: None. Designing instruction for an integrated development of writing, reading, speaking and listening with an emphasis on literacy acquisition in early childhood education Pre-K to 4th Grade.

318. *Storytelling in Early Childhood*. I, II. 3 HR. This course will assist students in telling, reading, and creating stories for children. Techniques, methods, and research effective in the art of storytelling will be examined and applied as they relate to total child development.

319. *Behavior Modification in Early Childhood Education*. I, II. 3 HR. PR: None. Application of behavior modification principles to classroom management in early childhood education Pre-K to 4th Grade.

323. *Contemporary Issues in English Education*. I. 3 HR. PR: Graduate standing. Provides the student with a knowledge of several contemporary issues in English teaching which have immediate and long-range ramifications for secondary-school English instruction. 1 HR. lec., 2 HR. sem.

324. *Advanced Methods in English Education*. II. 3 HR. PR: Graduate standing. (For classroom teachers of English). Will involve an analysis of recent trends and innovations in methodology. Readings and discussions will lead to the development of instructional strategies and units for secondary English classrooms. 1 HR. lec., 1 HR. lab., 1 HR. seminar.

330. *Mathematics in the Elementary School*. I, II, S. 3 HR. PR: Consent. Addresses current issues and trends in elementary mathematics education. Designed for the practicing elementary teacher.

333. *Corrective Techniques in Mathematics Education*. I, S. 3 HR. PR: Consent. Materials and methods used in diagnosis and remediation of learning difficulties in mathematics.

334. *Mathematics in the Secondary School*. I, S. 3 HR. PR: Consent. Patterns of mathematics curriculum in the secondary school; practices in teaching mathematics; preparation, selection and use of instructional materials. Designed for the practicing secondary mathematics teacher.

337. *Mathematics in the Junior High School and Middle School*. II. 3 HR. PR: 6 HR. college mathematics or consent. Study of teaching of mathematics in the junior high school and/or middle school; application of mathematics content to teaching; instructional techniques and materials.

340. *Science in the Elementary School*. I, II, S. 3 HR. PR: 20 HR. of undergraduate credit in elementary education, or consent. Analysis of methods, curriculum patterns, and trends in elementary school science. Understanding and development of scientific attitudes appropriate at the elementary-school level.

344. *Science in the Secondary School*. 3 HR. PR: Consent. Nature and function of science in secondary schools supported by current research and development; includes analysis of structure and practice of science curriculum and instruction issues. 3 HR. lec.

350. *Social Studies in the Elementary School*. I, II, S. 3 HR. PR: 20 HR. of undergraduate credit in elementary education, or consent. Comprehensive consideration of objectives, content, methods, including unit procedures; materials including objects, models, exhibits, and museum items, as well as textbooks, collateral reading, maps, and graphs; means of evaluating social growth and development.

354. *Social Studies in the Secondary School*. S. 3 HR. PR: Consent. Nature and function of social studies in the secondary school; utilization of community, state, national, and world resources in teaching; selection of content for teaching purposes; curriculum construction with emphasis on resource and teaching units.

357. *Principles of Economic Education*. S. 3 HR. Workshop for principals, teachers, and supervisors with emphasis on the economic structure of our society and methods of integrating economics into the school program. (Sponsored jointly by College of Human Resources and Education and College of Business and Economics.)

359. *Classroom Simulation Techniques*. II, S. (Alternate years.) 3 HR. To provide experience in the use of learning games and simulations as an instructional technique and the opportunity to develop-under supervision-simulated activities and games to be used in a variety of learning environments.

361. *Computers in the Content Areas*. I. 3 HR. Development of extensive curriculum units on the use of computers and other technologies in teaching and learning. Students will inform one another of various uses of computers in learning.

362. *Hypermedia in Learning*. I, II. 3 HR. Survey of Theory, research, and application of hypermedia and the authoring language - Authorware.

363. *Software Development. II. 3 HR.* Principles and models of software design and the authoring language -HyperCard.

373. *Professional Development. I, II, S. 1-6 HR.* (May be repeated for credit.) PR: Department consent. Specially designed for those interested in advancing professional skills in a particular specialty. (Not for degree credit in programs in the College of Human Resources and Education.) (Graded as S/U.)

377. *Children's Television: Problems and Potentials. S. 4 HR.* PR: Consent. Provides parents and teachers with strategies for monitoring, evaluating, and directing television viewing habits of youth; pertinent research studies, school and community action programs, and home and school education programs are discussed and practiced.

380. *Special Topics. I, II, S. 1-6 HR.* PR: Consent.

383. *Seminar. I, II, S. 1-6 HR.* PR: Consent.

385. *Supervision of Student Teachers. I, II, S. 3 HR.* PR: Consent. For persons working or intending to work with education students in field experiences. Course focuses on the development and application of supervisory skills in effective guidance of student teachers and education students.

386. *Teaching Strategies for Middle Childhood. II, S. 3 HR.* Surveys instructional strategies appropriate for facilitating preadolescent learning. Includes the role of the teacher; how the teacher uses resources within and outside the classroom as they relate to instruction of the learner, age 10-14 years.

387. *Advanced Teaching Strategies. I, II, S. 3 HR.* PR: Graduate standing. Deals with methods as one critical variable in teaching. Examines ways and means to describe, plan the use of, implement, and evaluate teaching methods. Analysis and implementation of teaching methods and component skills of teaching.

388. *Classroom Organization and Management. I, S. 3 HR.* Discusses research identifying components of classroom organization and environment which influence learning; reviews teacher behaviors and learning activities which research indicates lead to more effective teaching. Stresses implementation strategies relevant to classroom settings.

389. *Cultural Diversity in the Classroom. I, S. 3 HR.* PR: Graduate standing or consent. Provides opportunities for educators to increase awareness of their own ethnic backgrounds, foster understandings of the interactive effects of gender, race, ethnicity and socio-economic status, and develop appropriate teaching materials and methods.

391. *Advanced Topics. I, II, S. 1-6 HR.*

395. *Practicum. I, II, S. 1-12 HR.* per semester or session-aggregating not more than 12 HR. PR: 9 graduate hours in Education. (Enrollment with permission of advisor or instructor in consultation.) Special individual and group projects. To provide appropriate residence credits for special workshops, prolonged systematic conference, or problems and projects in education.

397. *Research. 1-15 HR.*

401. *Curriculum Development. I, II, S. 3 HR.* PR: Consent. The study of the concepts underlying school curriculum.

407. *Theories, Models and Research of Teaching. II. 3 HR.* PR: EDF 320 or consent. The theories behind selected models of teaching as well as research in teaching and best practices.

408. *Contemporary Determinants of Curriculum. II, S. 3 HR.* PR: C&I 401 and EDF 340 or consent. Contemporary determinants of curriculum development.

409. *Curriculum Theories. I, II, S. 3 HR.* PR: C&I 408 or consent. Theories underlying curriculum from the past to the present and projected to the future.

410. *Advanced Supervision. 3 HR.* PR: Consent. Exploring theories, research, and practices of pre-service and in-service instructional supervision in the classrooms of novice and mature teachers. (Also listed as EDA 410.)

438. *Survey of Major Issues in Mathematics Education*. II, S. 3 HR. PR: Consent. Individual and group research on selected topics in mathematics education.

457. *Social Studies Curriculum Development, K-12*. I. 3 HR. PR: C&I 301 or C&I 304 and C&I 350 or 354. Stresses the application of principles and procedures pertinent to the development of social studies programs in elementary and secondary schools. Strong emphasis will be placed on the analysis of current social studies curriculum materials.

460. *Planning Programs and Courses for Vocational Agriculture Department*. I, S. 2 HR. PR: C&I 188. Gathering data, studying the farming problems of all-day students, young farmers, and adult farmers, and planning the total program for the department.

471. *Assessing the Impact of Computer-Based Learning*. I. 3 HR. Survey of the current findings in computer-based learning; couples statistical features and design scenarios.

487. *Teaching Effectiveness*. 3 HR. PR: Advanced graduate standing or consent. Explores twentieth century/ attitudes toward effective teaching from a variety of perspectives; instigates teacher, learner, content and environment; examines how questions asked reveal thinking regarding interaction of elements of teaching/learning situation.

488. *Higher Education Curriculum*. II. 3 HR. Analysis and evaluation of post-secondary curriculum with emphasis on organizing, translating, and applying findings. Topics include curriculum shaping forces; institutional patterns; policy, components and change; and principles and techniques of development, experimentation, and evaluation.

489. *Teaching in Higher Education*. I. 3 HR. PR: Graduate standing. A general methods course involving instructional concepts and strategies for present/ prospective faculty in higher education. Comprehensive consideration of objectives, planning criteria and methods, teaching strategies, and evaluation in meeting the needs of adult learners.

490. *Teaching Practicum*. I, II, S. 1 to 3 HR. PR: Consent. Intended for graduate students with college teaching responsibility. Provides a supervised experience in a teaching situation. (Graded as S/U.)

491. *Advanced Study*. I, II, S. 1-6 HR.

492. *Directed Study*. 1-6 HR.

493. *Special Topics*. 1-6 HR.

494. *Special Seminars*. 1-6 HR.

495. *Independent Study*. 1-6 HR.

496. *Advanced Seminar*. I, II. 1 HR. PR: Consent. Opportunity for the advanced graduate students to present the student's research to faculty and/or student groups.

497. *Research*. I, II, S. 1-15 HR.

498. *Thesis*. 2-4 HR.

499. *Colloquium in Curriculum and Instruction*. I, II, S. 1-6 HR. PR: Consent. For graduate students not seeking course work credit, but who wish to participate in academic programs.

Reading

R. Jerrald Shive, Department Chairperson, Educational Theory and Practice
607 Allen Hall

Degree Offered:

Master of Arts

The Department of Educational Theory and Practice provides opportunities for graduate study and research leading to the master of arts for educators and other professionals with educational responsibilities. The primary purpose of the master's program in reading is to provide increased knowledge, skill, and competence for teachers or those who work in the field. The program contains a number of related options for emphasis within its framework, making it flexible enough to meet a wide variety of needs.

Options are planned by the student, the student's advisor, and the student's graduate committee to fit the student's career plans. In addition to the general requirements of the University and the College of Human Resources and Education, the department requires a core of courses or course areas and supporting competencies.

Requirements

All applicants must comply with the general WVU requirements, and requirements of the College of Human Resources and Education and the reading program.

Professionals with successful teaching experience at the elementary, secondary, or college level may elect to enroll in these courses to increase their competencies as reading teachers, to keep themselves informed of latest trends and developments in reading education, or to prepare for positions of greater responsibility. Students who plan to enter the teaching field may also wish to enroll in these courses to increase their overall skills and knowledge.

Courses

Course offerings provide opportunities to become familiar with the organization, implementation, and administration of developmental and remedial reading programs at the elementary, secondary, and college levels. Advanced students of superior academic and professional background have opportunities to participate in clinical work and to become involved in research.

Programs of study for the doctor of education degree are worked out individually with each student. Course requirements depend upon previous academic background and experience and the position for which the student wishes to prepare. Practical training for teachers and specialists-in-training is provided by the Reading Clinic.

For further information on admission and program requirements, write Chairperson, Department of Educational Theory and Practice, College of Human Resources and Education, 602 Allen Hall, P.O. Box 6122, Morgantown, WV 26506-6122.

- Students must complete six or more hours in reading within two years after admission (probationary or regular) or admission will be invalidated and the student will be required to reapply.
- Program A—Completion of a minimum of 36 hours including the completion of a problem or thesis.
- Program B—Completion of a minimum of 36 hours of course work.
- Successful completion of a written final examination.

The course requirements in Program A and B lead to reading specialist certification. Electives should be decided in conference with advisor.

Required Courses	Hours	
	Program A	B
RDNG 321	3	3
RDNG 322	3	3
RDNG 324	3	3
RDNG 326	3	3
RDNG 327	3	3
RDNG 340	3	3
RDNG 341	3	3
RDNG 495	6	0
C&I 301 or 304 or 307	0	3
ED P 330 or RDNG 380 <i>Measurement/Evaluation in Lang. Arts</i>	3	3
ED P 300 or 450 or 451 or PSYC 263 or 264 or 281	3	3
SPED 250 or PSYC 282	3	3
Subtotal	36	33
Electives	0	3
Total	36	36

Reading (RDNG)

221. *Developmental Reading*. I, II, S. 3 HR. PR: Consent. Fundamentals of reading instruction. Emphasizes classroom organization and teaching techniques. (Last offering , spring, 1998.)

222. *Reading in the Content Areas*. I, II. 2 HR. Skills and strategies needed by content area teachers to reinforce the reading skills necessary for the effective learning of secondary students in the content areas. (Last offering fall, 1998.)

240. *Corrective Language Arts Techniques*. I, II. 3 HR. PR: RDNG 221, consent. Fundamentals of informal language arts diagnosis and corrective classroom language arts instruction. A practicum for the utilization of informal diagnosis and corrective techniques. (Last offering fall, 1998.)

283. *Special Workshop in Reading*. I, II, S. 1-6 HR. For elementary and secondary students in pre-service education programs, as well as elementary and secondary teachers in in-service education.

321. *Reading and Writing Instruction in Elementary Schools*. 3 HR. Examines processes of reading and writing at the elementary school level. Explores instructional practices associated with those processes.

322. *Content Area Literacy Instruction*. 3 HR. Presents essential content area literacy skills and examines ways in which they may be developed in various subject-matter areas.

323. *Literacy and the Young Child*. 3 HR. focus is on perspectives of young children's reading and writing development and approaches for fostering this development in school and home settings.

324. *Foundations of Literacy*. 3 HR. Inquiry into the historical, psychological, and linguistic foundations underpinning literacy instruction. Students will also consider the interdisciplinary nature of the study of literacy.

325. *Survey of Reading Research*. 3 HR. A research course in which each student will complete as individual problem in an area of special interest.

326. *Literacy Leadership*. 3 HR. PR: 18 HR. of M.A. requirements. Roles, responsibilities, and practices of reading specialists, administrators, and classroom teachers in organizing literacy programs from early childhood through college.

327. *Developing Reading Interests*. I, II, S. 3 HR. Emphasis on methods and techniques for developing reading habits, interests, and tastes and on motivating individuals to read. Special attention is given to instructional practices which support the pursuit of independent reading.

330. *Teaching the Language Arts*. 3 HR. Explores the interrelationship of the language arts — writing, reading, speaking, and listening. Special attention is given to understanding instructional practices, organizing language arts programs, and selecting materials.

331. *Selection and Evaluation of Reading Materials*. I, S. 3 HR. PR: RDNG 321. Survey of critical reading skills, techniques, and procedures with emphasis on the selection of supplementary materials needed for effective development and remedial reading programs.

332. *Survey of Major Problems in the Language Arts*. II, S. 3 HR. PR: RDNG 330 or consent. An advanced course covering major problems of the teacher or supervisor of language arts instruction. A research course in which the student completes an individual problem.

340. *Instructing Students Who Have Reading Difficulties*. II, S. 3 HR. PR: 6 HR. of RDNG 321 and RDNG 324 or RDNG 322. A methods course that emphasizes ways to intervene when students face reading difficulties. Course focuses on methods that can be used by classroom teachers, reading specialists, and other special teachers of reading and language arts.

341. *Problems in Reading*. II, S. 3 HR. PR: RDNG 340. A laboratory course in the University Reading Clinic. Major emphasis on tutoring children who have reading problems.

342. *Teaching Reading to Children Who Have Profound Reading Problems*. 3 HR. Basic course on reading intervention methods. Intended for learning disabilities majors. Emphasis on practicum experience.

373. *Professional Development*. 1-6 HR.

380. *Seminar*. I, II, S. 1-6 HR. PR: Consent. Seminar for master's degree students stressing special topics concerned with the education and sociological and psychological aspects of language arts instruction.

381. *Special Topics*. I, II, S. 1-6 HR. PR: Consent. Special topics or research in reading and language arts for master's degree students in reading.

385. *Practicum*. I, II, S. 1-12 HR. PR: Consent. Practicum type course for master's degree student teaching, and reading administration and supervision practicum experience can be pursued.

391. *Advanced Topics*. 1-6 HR.

397. *Research*. 1-15 HR.

443. *Instructional Intervention for Reading Difficulties*. 3 HR. PR: Consent. Advanced course focusing on ways to assess and instruct students who have reading difficulties. Explores theories, issues, and methodology.

444. *Advanced Clinical Reading*. I, II, S. 3 HR. PR: RDNG 341. Laboratory course in remedial reading. Emphasis on diagnosis and treatment of reading difficulties.

480. *Seminar*. I, II, S. 1-12 HR. PR: Consent. The interrelationships among the language arts: mental, physical, and psychological deterrents to language arts; and similar topics.

481. *Special Topics*. I, II, S. 1-6 HR. PR: Admission to doctoral program in reading and consent. Advanced seminar. Weaknesses and strengths in current reading programs, needed research in reading, and suggestions for improving reading instruction at elementary, secondary, and college levels.

485. *Practicum*. I, II, S. 1-12 HR. PR: Consent. Practical application of reading theory to organizing and conducting developmental and remedial reading programs.

490. *Teaching Practicum*. 1-3 HR.

491. *Advanced Study*. 1-6 HR.

492. *Directed Study*. 1-6 HR.

493. *Special Topics*. 1-6 HR.

- 494. *Special Seminars*. 1-6 HR.
- 495. *Independent Study*. 1-6 HR.
- 496. *Graduate Seminar*. 1 HR.
- 497. *Research*. 1-15 HR.
- 498. *Thesis*. 2-4 HR.
- 499. *Graduate Colloquium*. 1-6 HR.

Rehabilitation Counseling

Robert P. Marinelli, Program Coordinator
 504 Allen Hall, P.O. Box 6122

Degree Offered: Master of Science

Master of Science in Rehabilitation Counseling

The rehabilitation counseling program in the College of Human Resources and Education offers a curriculum at the master's degree level. All students complete general course work in counseling as well as more specific course work in rehabilitation counseling.

This professional counseling specialty provides counseling services, with a focus on career issues, to persons with physical disabilities or learning difficulties and those who are seeking readjustment from emotional problems. Counselors work for both public and private rehabilitation agencies, centers, workshops, and industry. The program is fully accredited by the Council on Rehabilitation Education (CORE).

The degree requirements include completion of the core courses, required rehabilitation counseling courses, and a 15 hour supervised clinical practice placement (internship) under faculty direction in a rehabilitation setting. The rehabilitation counseling program requires a minimum of 48 semester hours with a 3.0 grade-point average. In addition to completing all course work and the internship satisfactorily, a candidate must demonstrate the ability to assume the responsibility required of a professional counselor and the personal characteristics essential to effective working relationships with others.

Rehabilitation degree programs are available for both full-time and part-time students. Contact the program coordinator for information concerning the availability of course work for students interested in an evening part-time program which admits students every three years.

Students may take the professional certification examinations to obtain national certification as a rehabilitation counselor during their internship semester. Graduates with two years or more of supervised experience after completion of their master's degree are typically eligible for licensure as a counselor in West Virginia following the successful completion of an appropriate counseling certification or licensing examination.

Required Courses

All students are required to take the following core courses:

COUN 301	<i>Counseling Techniques</i>
COUN 305	<i>Theory and Practice of Human Appraisal</i>
COUN 306	<i>Counseling Theories</i>
COUN 309	<i>Group Counseling Theory and Techniques</i>

REHB 300	<i>Introduction to Rehabilitation Services</i>
REHB 310	<i>Medical Aspects of Disability</i>
REHB 312	<i>Psychological Aspects of Disability</i>
REHB 320	<i>Career Development and Job Placement</i>
REHB 472	<i>Counseling Practicum</i>
REHB 475	<i>Clinical Practice</i>
REHB 480	<i>Research Seminar</i>

Application

Applications for admission to the Rehabilitation Counseling program should be made to West Virginia University, Office of Admissions and Records. In addition to the admission requirements of the University and the College of Human Resources and Education, the Rehabilitation Counseling program has the following admission requirements.

- A baccalaureate degree with course work in appropriate areas;
- A minimum undergraduate grade-point average of 2.5 based on a 4.0 system (students with a lower grade point average and otherwise exceptional credentials may be admitted provisionally);
- Three letters of reference;
- Completion of the application to the rehabilitation counseling program.

The initial screening decision is based upon this information as well as considering the applicant's previous work or related experiences related to persons with disabilities. Successful applications are then interviewed by program faculty. Final decisions about admission are based on both the requirements and the interview process.

Admission

The West Virginia University Rehabilitation Counseling program's admission process is a two-step procedure. Step 1 is a review of paper credentials including references, department application (relevant major, general quality of application), work experiences, and GPA.

Step 2 is the department interview, which considers interpersonal style relevant to working as a counselor, communication skills, capacity for empathic understanding and communication, ability to articulate professional goals, goals congruent with department focus, knowledge and understanding of rehabilitation counseling and assessment of applicants' capacity to complete the rehabilitation counseling, curriculum successfully.

The **preferred** application deadline for receiving the completed application materials is March 15, however, applications will be accepted until April 15 for fall full-time and regular part-time admission. The deadline for the next evening part-time program which will begin in January 2001 is October 15, 2000.

Counseling (COUN)

301. *Counseling Techniques*. I, II, S. 3 HR. PR: Consent. Development and application of basic counseling skills including interviewing, clinical observation, and a general orientation to counseling settings. Evaluation will be based on strengths and deficits in intra- and interpersonal skills and on demonstration of counseling skills in checkout situations. In setting laboratory experience required.

305. *Theory and Practice of Human Appraisal*. I, II, S. 3 HR. An overview of standardized evaluation methods commonly utilized in educational and rehabilitation settings. Experience is provided in selection, administration, and interpretation of selected instruments.

306. *Counseling Theories*. II, S. 3 HR. PR: COUN 301 and consent. A study of counseling approaches commonly used in public schools, colleges, and rehabilitation agencies. Application of theory emphasized.

Rehabilitation Counseling (REHB)

300. *Introduction to Rehabilitation Services*. I, 3 HR. PR: Consent. Introduction to comprehensive rehabilitation, its history and development as a philosophy process, and professional area. Professional and ethical issues in rehabilitation counseling. Other services involved in various rehabilitation settings.

310. *Medical Aspects of Rehabilitation*. II, 3 HR. PR: Consent. An overview of medical aspects and implications of disability for the handicapped person in the rehabilitation process. Studies of the more common severe disabilities and their remediation also will be included.

312. *Psychological Aspects of Disability*. II, S. 1-3 HR. PR: REHB 310; graduate standing and consent. The impact of disability considering cultural, interpersonal, and intrapersonal factors. Methods of assisting persons to adjust to problems of disability.

314. *Special Problems in Rehabilitation*. I, II, 3 HR. PR: Graduate standing and consent. Rehabilitation theory and techniques in problems such as blindness, epilepsy, and mental retardation. Concentrated study in special institutes.

320. *Career Development and Job Placement*. II, 3 HR. PR: Consent and graduate standing in social sciences or education. Principles and methods involved in the vocational counseling and placement of disabled persons. The use of occupational and educational information. Theories of career development, occupational analysis, and job placement in rehabilitation.

321. *Vocational Evaluation Systems and Techniques*. II, 3 HR. PR: REHB 300. An introduction to vocational evaluation. Formal and informal vocational evaluation systems and procedures will be explored with the goal of preliminary development of individualized evaluation plans.

322. *Advanced Vocational Evaluation Techniques*. S. 3 HR. PR: REHB 321. Advanced vocational evaluation systems including empirically based and informal systems will be studied. Emphasis will be on administration, scoring, and interpretation, particularly as it relates to handicapped populations with specific evaluation problems.

323. *Seminar in Vocational Evaluation Services*. S. 3 HR. PR: REHB 321 and consent. Supervisory and professional issues in vocational evaluation services with an emphasis on standards, methods, procedures and resources for developing and maintaining vocational evaluation services.

374. *Field Work in Rehabilitation*. I, II, S. 1-6 HR. PR: Consent. Supervised field work experience in rehabilitation settings to provide rehabilitation counseling students with a more adequate orientation to their profession.

391. *Advanced Topics*. I, II, S. 1-6 HR.

462. *Clinical Conference in Vocational Rehabilitation*. II, 3 HR. PR: REHB 300, graduate standing, and consent. Exploration and evaluation of current methods of service delivery to vocational rehabilitation clients. Analysis and integration of service systems and the needs of the disabled client.

472. *Counseling Practicum*. I, II, S. 1-4 HR. PR: Graduate standing, liability insurance, and consent. Supervised experience in the application of counseling techniques in the rehabilitation process. Demonstration of high professional standards, counseling skills, and personal characteristics appropriate to the counseling relationship are essential.

475. *Clinical Practice*. 1-15 HR. PR: Consent, following at least one academic semester in the classroom. Clinical practice (internship) in selected agencies, rehabilitation centers, clinics, or hospitals conducting an organized program of services for the physically, mentally, emotionally, or socially handicapped. Practice will be under direct supervision of faculty and agency personnel.

480. *Seminar*. I, II, S. 1-12 HR. PR: Consent. Administration of programmatic research; legal and ethical issues in research and service programs, etc.

481. *Special Topics*. I, II, S. 1-6 HR. PR: Consent. Contemporary issues in the behavioral sciences and rehabilitation.

482. *Workshop in Rehabilitation*. I, II, S. 1-12 HR. PR: Consent. Supervision in the counseling process; vocational evaluation in rehabilitation; utilization of rehabilitation research; contemporary issues in rehabilitation.

490. *Teaching Practicum*. I, II, S. 1-3 HR. PR: Consent. Intended for graduate students with college teaching responsibility. Provides a supervised experience in a teaching situation. (Graded S or U.)

491. *Advanced Study Project in Rehabilitation Education*. I, II, S. 3-6 HR. Research for the program leading to the certificate of advanced study in education.

496. *Graduate Seminar*. I, II, 1 HR. PR: Consent. Opportunity for the advanced graduate student to present the student's research to faculty and/or student groups.

497. *Research*. I, II, S. 1-15 HR.

499. *Graduate Colloquium*. I, II, S. 1-6 HR. PR: Consent. For graduate students not seeking course work credit, but who wish to participate in academic programs.

Secondary Education

R. Jerrald Shive, Department Chairperson, Educational Theory and Practice

602 Allen Hall

Degree Offered:

Master of Arts

Program

The Department of Educational Theory and Practice opportunities for graduate study and research leading to the degree of master of arts, for educators and other professionals with educational responsibilities. The primary purpose of the masters program in secondary education is to provide increased knowledge skill, and competence for licenses teachers working with students in a secondary school setting.

The graduate program in secondary education emphasizes both pedagogical and content knowledge.

Master of Arts in Secondary Education

The College of Human Resources and Education offers a master of arts program in secondary education for persons who teach or work in teaching-related situations with adolescents and adults. The purpose of the program is to provide academic experiences to increase skills in teaching and curriculum development and knowledge of a teaching specialization. The program provides the opportunity to specialize in working with students in junior, middle, and high schools. Electives are used to provide a solid basis in the subject area that the student teaches.

For further information on admission and program requirements, write Chairperson, Educational Theory and Practice, WVU College of Human Resources and Education, 602 Allen Hall, P.O. Box 6122, Morgantown, WV 26506-6122. All applicants must comply with the requirements of the College of Human Resources and Education.

Secondary Education

	Hours		
	A*	B**	C***
Graduate Courses in Education Program			
C&I 304	3	3	3
ED F 320 or 340	3	3	3
Approved course in Curriculum/Instruction in student's content field	3	3	3
Approved course in General Teaching Strategies or General Curriculum Development	3	3	3
ED P 320	3	3	0
C&I 391	0	3	0
C&I 497	6	0	0
Approved Education Electives	0	3	6-12
Approved Graduate Courses Outside of Education	9	9	12-18
	30	30	36

* Thesis required.

** Problem required.

*** 36 semester hour course work program.

New requirements for the master's degree in secondary education are now being developed. Information concerning any new degree requirements will be available from the Department of Educational Theory and Practice.

Advisor will provide lists of courses which may be selected, usually courses in the student's content speciality.

Higher Education Curriculum and Teaching

	Hours
Graduate Courses in Education	18-24
Required Courses in Education	15
ED F 320 or ED F 340	3
C&I 307	3
C&I 387	3
C&I 489	3
ED P 300	3
Approved Education Electives	3-9
Graduate Courses in an Academic Area	12-18
Total	36

A combination of undergraduate courses and courses in the graduate program is necessary to meet certification requirements.

Curriculum and Instruction (C&I)

210. *Early Childhood Education 1*. I, II, S. 3 HR. PR: CDFS 216. An introduction to curriculum objectives, instructional methods and materials, and evaluation in early childhood education. (Pre-K to 4th grade) that includes a field experience with individualized instruction for one child.

211. *Early Childhood Education 2*. I, II, S. 3 HR. PR: C&I 210. This course is designed for individuals who will be working in early childhood education Pre-K to 4th Grade. Topics include: working with families of young children; designing, teaching and evaluating experiential lessons for small group of children; and gathering and assessing developmental data on small groups of children. A semester-long field experience with a class of young children is required.

212. *Methods in Preschool Education*. I. 3 HR. PR: EDUC 100 or equiv. Development of an experiential model of teaching young children. Application of methods in basic needs areas of nursery-early childhood education consistent with an experiential model of teaching.

214. *Creative Experiences in Early Childhood*. II. 3 HR. PR: EDUC 100 or equiv. Examination of creative experiences for young children and their relationship to child development. A special focus on play behavior as a learning medium with emphasis on program planning, curriculum development, and instructional strategies.

216. *Early Language and Communication Experiences*. I. 3 HR. PR: EDUC 100 or equiv. Presents activities for developing language and communication skills in children 2-5 years of age. Covers a broad range of temporary and enduring forms of communication in visible and audible media.

218. *Management of Preschool Education*. II. (Alternate Years.) 3 HR. PR: EDUC 100 or equiv. (A field experience with children 2-5 years of age is required.) Planning, designing, and assessing programs for children ages 2-5 years with emphasis on management skills.

224. *Approaches to Teaching Language*. II. 2 HR. PR: LING 1 and ENGL 2. Designed for prospective teachers of English and language arts. Focus is upon planning and implementing methods of teaching English as a language. Materials and resources appropriate for public school instruction are analyzed and utilized.

225. *Approaches to Teaching Language*. II. 2 HR. PR: Junior standing. Designed for prospective teachers of English and language arts. Course focuses upon methodologies for teaching literature in public schools. Workshop format will provide opportunities for peer teaching activities as students apply methods of teaching literature.

280. *Special Problems and Workshops*. I, II, S. 2-4 HR. (Maximum of 8 semester hours may be applied toward the master's degree.) PR: 14 HR. in education. Credits for special workshops and short intensive unit courses on methods, supervision, and other special topics.

287. *Advanced Clinical Experience*. I, II, S. 1-6 HR. PR: Consent. Clinical experience in teaching-learning situations at any level.

300. *U.S. Education for International Students*. I. 3 HR. PR: International students with graduate status and developing oral and written English skills. To assist international students in understanding the U.S. system of education. Included: dominant U.S. values related to education; structure of U.S. education at all levels; models and strategies; field trips; international comparisons.

301. *The Elementary-School Curriculum*. I, II, S. 3 HR. PR: 20 hours of undergraduate credit in elementary education, or consent. Analysis of curriculum designs in elementary education with emphasis on methods and techniques of development.

304. *The Secondary School Curriculum*. I, II, S. 3 HR. PR: High-school teaching experience or consent. Emphasizes socioeconomic and cultural influences on the curriculum; principles of curriculum development; curriculum building in the various teaching fields; techniques of experimentation and evaluation; and practice in curriculum building with special emphasis on unit construction.

306. *Curriculum for Middle Childhood*. I, S. 3 HR. Survey course which includes: historical, social, and cultural influences on the curriculum; the learner characteristics; curriculum and instructional organization and their relationship to facilities available; evaluation and implementation of middle childhood curriculum.

308. *Introduction to Alternative Learning Environments*. I. 3 HR. This course will provide opportunities for educators to explore and analyze the trends and issues in alternative learning environments in public education. public education.

309. *Experiences in Alternative Learning Environments*. I. (Alternate years.) 6 HR. PR: C&I 308, EDF 320, and consent. This course helps teachers to learn and practice skills that are needed to be an effective teacher in an alternative teaching environment.

312. *Early Childhood Curriculum*. 1. 3 HR. PR: (C&I 210 and C&I 211) or consent. Curriculum development for early childhood education Pre-K to 4th Grade, including social, creative, cognitive, physical, and academic goals. Societal, historical, and theoretical influences on early childhood curriculum are examined.

314. *Early Childhood Instruction*. I, II. 3 HR. PR: (C&I 210 and C&I 211) or consent. Design of instruction for continuous improvement toward mastery of curriculum goals for early childhood education Pre-K to 4th grade.

316. *Early Childhood Program Development and Evaluation*. I. 3 HR. PR: (C&I 210 and C&I 211) or consent. Development, administration, and evaluation of facilities, programs, and support systems for early childhood education Pre-K to 4th grade. Includes a focus on family connections and support systems related to early childhood classrooms.

317. *Language Arts in Early Childhood*. I, II. 3 HR. PR: None. Designing instruction for an integrated development of writing, reading, speaking and listening with an emphasis on literacy acquisition in early childhood education Pre-K to 4th Grade.

318. *Storytelling in Early Childhood*. I, II. 3 HR. This course will assist students in telling, reading, and creating stories for children. Techniques, methods, and research effective in the art of storytelling will be examined and applied as they relate to total child development.

319. *Behavior Modification in Early Childhood Education*. I, II. 3 HR. PR: None. Application of behavior modification principles to classroom management in early childhood education Pre-K to 4th Grade.

323. *Contemporary Issues in English Education*. I. 3 HR. PR: Graduate standing. Provides the student with a knowledge of several contemporary issues in English teaching which have immediate and long-range ramifications for secondary-school English instruction. 1 HR. lec., 2 HR. sem.

324. *Advanced Methods in English Education*. II. 3 HR. PR: Graduate standing. (For classroom teachers of English). Will involve an analysis of recent trends and innovations in methodology. Readings and discussions will lead to the development of instructional strategies and units for secondary English classrooms. 1 HR. lec., 1 HR. lab., 1 HR. seminar.

330. *Mathematics in the Elementary School*. I, II, S. 3 HR. PR: Consent. Addresses current issues and trends in elementary mathematics education. Designed for the practicing elementary teacher.

333. *Corrective Techniques in Mathematics Education*. I, S. 3 HR. PR: Consent. Materials and methods used in diagnosis and remediation of learning difficulties in mathematics.

334. *Mathematics in the Secondary School*. I, S. 3 HR. PR: Consent. Patterns of mathematics curriculum in the secondary school; practices in teaching mathematics; preparation, selection and use of instructional materials. Designed for the practicing secondary mathematics teacher.

337. *Mathematics in the Junior High School and Middle School*. II. 3 HR. PR: 6 HR. college mathematics or consent. Study of teaching of mathematics in the junior high school and/or middle school; application of mathematics content to teaching; instructional techniques and materials.

340. *Science in the Elementary School*. I, II, S. 3 HR. PR: 20 HR. of undergraduate credit in elementary education, or consent. Analysis of methods, curriculum patterns, and trends in elementary school science. Understanding and development of scientific attitudes appropriate at the elementary-school level.

344. *Science in the Secondary School*. 3 HR. PR: Consent. Nature and function of science in secondary schools supported by current research and development; includes analysis of structure and practice of science curriculum and instruction issues. 3 HR. lec.

350. *Social Studies in the Elementary School*. I, II, S. 3 HR. PR: 20 HR. of undergraduate credit in elementary education, or consent. Comprehensive consideration of objectives, content, methods, including unit procedures; materials including objects, models, exhibits, and museum items, as well as textbooks, collateral reading, maps, and graphs; means of evaluating social growth and development.

354. *Social Studies in the Secondary School*. S. 3 HR. PR: Consent. Nature and function of social studies in the secondary school; utilization of community, state, national, and world resources in teaching; selection of content for teaching purposes; curriculum construction with emphasis on resource and teaching units.

357. *Principles of Economic Education*. S. 3 HR. Workshop for principals, teachers, and supervisors with emphasis on the economic structure of our society and methods of integrating economics into the school program. (Sponsored jointly by College of Human Resources and Education and College of Business and Economics.)

359. *Classroom Simulation Techniques*. II, S. (Alternate years.) 3 HR. To provide experience in the use of learning games and simulations as an instructional technique and the opportunity to develop-under supervision-simulated activities and games to be used in a variety of learning environments.

361. *Computers in the Content Areas*. I. 3 HR. Development of extensive curriculum units on the use of computers and other technologies in teaching and learning. Students will inform one another of various uses of computers in learning.

362. *Hypermedia in Learning*. I, II. 3 HR. Survey of Theory, research, and application of hypermedia and the authoring language - Authorware.

363. *Software Development*. II. 3 HR. Principles and models of software design and the authoring language -HyperCard.

373. *Professional Development*. I, II, S. 1-6 HR. (May be repeated for credit.) PR: Department consent. Specially designed for those interested in advancing professional skills in a particular specialty. (Not for degree credit in programs in the College of Human Resources and Education.) (Graded as S/U.)

377. *Children's Television: Problems and Potentials*. S. 4 HR. PR: Consent. Provides parents and teachers with strategies for monitoring, evaluating, and directing television viewing habits of youth; pertinent research studies, school and community action programs, and home and school education programs are discussed and practiced.

380. *Special Topics*. I, II, S. 1-6 HR. PR: Consent.

383. *Seminar*. I, II, S. 1-6 HR. PR: Consent.

385. *Supervision of Student Teachers*. I, II, S. 3 HR. PR: Consent. For persons working or intending to work with education students in field experiences. Course focuses on the development and application of supervisory skills in effective guidance of student teachers and education students.

386. *Teaching Strategies for Middle Childhood*. II, S. 3 HR. Surveys instructional strategies appropriate for facilitating preadolescent learning. Includes the role of the teacher; how the teacher uses resources within and outside the classroom as they relate to instruction of the learner, age 10-14 years.

387. *Advanced Teaching Strategies*. I, II, S. 3 HR. PR: Graduate standing. Deals with methods as one critical variable in teaching. Examines ways and means to describe, plan the use of, implement, and evaluate teaching methods. Analysis and implementation of teaching methods and component skills of teaching.

388. *Classroom Organization and Management*. I, S. 3 HR. Discusses research identifying components of classroom organization and environment which influence learning; reviews teacher behaviors and learning activities which research indicates lead to more effective teaching. Stresses implementation strategies relevant to classroom settings.

389. *Cultural Diversity in the Classroom*. I, S. 3 HR. PR: Graduate standing or consent. Provides opportunities for educators to increase awareness of their own ethnic backgrounds, foster understandings of the interactive effects of gender, race, ethnicity and socio-economic status, and develop appropriate teaching materials and methods.

391. *Advanced Topics*. I, II, S. 1-6 HR.

395. *Practicum*. I, II, S. 1-12 HR. per semester or session-aggregating not more than 12 HR. PR: 9 graduate hours in Education. (Enrollment with permission of advisor or instructor in consultation.) Special individual and group projects. To provide appropriate residence credits for special workshops, prolonged systematic conference, or problems and projects in education.

397. *Research*. 1-15 HR.

401. *Curriculum Development*. I, II, S. 3 HR. PR: Consent. The study of the concepts underlying school curriculum.

407. *Theories, Models and Research of Teaching*. II. 3 HR. PR: EDF 320 or consent. The theories behind selected models of teaching as well as research in teaching and best practices.

408. *Contemporary Determinants of Curriculum*. II, S. 3 HR. PR: C&I 401 and EDF 340 or consent. Contemporary determinants of curriculum development.

409. *Curriculum Theories*. I, II, S. 3 HR. PR: C&I 408 or consent. Theories underlying curriculum from the past to the present and projected to the future.

410. *Advanced Supervision*. 3 HR. PR: Consent. Exploring theories, research, and practices of pre-service and in-service instructional supervision in the classrooms of novice and mature teachers. (Also listed as EDA 410.)

438. *Survey of Major Issues in Mathematics Education*. II, S. 3 HR. PR: Consent. Individual and group research on selected topics in mathematics education.

457. *Social Studies Curriculum Development, K-12*. I. 3 HR. PR: C&I 301 or C&I 304 and C&I 350 or 354. Stresses the application of principles and procedures pertinent to the development of social studies programs in elementary and secondary schools. Strong emphasis will be placed on the analysis of current social studies curriculum materials.

460. *Planning Programs and Courses for Vocational Agriculture Department*. I, S. 2 HR. PR: C&I 188. Gathering data, studying the farming problems of all-day students, young farmers, and adult farmers, and planning the total program for the department.

471. *Assessing the Impact of Computer-Based Learning*. I. 3 HR. Survey of the current findings in computer-based learning; couples statistical features and design scenarios.

487. *Teaching Effectiveness*. 3 HR. PR: Advanced graduate standing or consent. Explores twentieth century/ attitudes toward effective teaching from a variety of perspectives; instigates teacher, learner, content and environment; examines how questions asked reveal thinking regarding interaction of elements of teaching/learning situation.

488. *Higher Education Curriculum*. II. 3 HR. Analysis and evaluation of post-secondary curriculum with emphasis on organizing, translating, and applying findings. Topics include curriculum shaping forces; institutional patterns; policy, components and change; and principles and techniques of development, experimentation, and evaluation.

489. *Teaching in Higher Education*. I. 3 HR. PR: Graduate standing. A general methods course involving instructional concepts and strategies for present/ prospective faculty in higher education. Comprehensive consideration of objectives, planning criteria and methods, teaching strategies, and evaluation in meeting the needs of adult learners.

490. *Teaching Practicum*. I, II, S. 1 to 3 HR. PR: Consent. Intended for graduate students with college teaching responsibility. Provides a supervised experience in a teaching situation. (Graded as S/U.)

491. *Advanced Study*. I, II, S. 1-6 HR.

492. *Directed Study*. 1-6 HR.

493. *Special Topics*. 1-6 HR.

494. *Special Seminars*. 1-6 HR.

495. *Independent Study*. 1-6 HR.

496. *Advanced Seminar*. I, II. 1 HR. PR: Consent. Opportunity for the advanced graduate students to present the student's research to faculty and/or student groups.

497. *Research*. I, II, S. 1-15 HR.

498. *Thesis*. 2-4 HR.

499. *Colloquium in Curriculum and Instruction*. I, II, S. 1-6 HR. PR: Consent. For graduate students not seeking course work credit, but who wish to participate in academic programs.

Social and Cultural Foundations

David L. McCrory

509 Allen Hall

The social and cultural foundations program in the College of Human Resources and Education offers opportunities for advanced graduate study. While the foundations program does not offer a degree, students are encouraged to minor in the area. The minors might consist of intense study in the areas of history, sociology, philosophy, comparative education, qualitative research, and policy analysis. The minor in foundations offers students the opportunity to tailor, in cooperation with the foundations faculty, a program to meet specific research interests.

Social and Cultural Foundations (SCFD)

300. *Sociology of Education*. I or II. 3 HR. Education as a social institution; cultural and class influences on education; social roles and career patterns in the school system; the school and problems of the community. (Also listed as SOCA 232.)

320. *Philosophic Systems and Education*. I, II, S. 3 HR. Examines different systems of educational philosophies focusing on aims, values, and criteria of education. Stresses the application of philosophic thinking to educational language, issues, methods, and subject matter.

340. *History of American Education*. I, II, 3 HR. Major forces affecting U.S. educational developments at all school levels are examined in political, social, economic, and cultural context. Major historical periods include colonial, early national, pre/post civil war, and late nineteenth to mid-twentieth century.

350. *Comparative Education*. 3 HR. PR: Graduate standing. Compares educational systems in selected foreign countries with the United States. Examines formal and informal educational influences in historical and contemporary contexts and in socioeconomic, political, and philosophical perspectives.

380. *Special Problems*. 1-6 HR. PR: Consent.

385. *Practicum*. 1-12 HR. PR: Consent.

390. *Special Topics*. 1-6 HR. PR: Consent.

391. *Advanced Topics*. 1-6 HR.

491. *Advanced Study*. 1-6 HR. PR: Consent.

Special Education

R. Jerrald Shive, Educational Theory and Practice

Degrees Offered:

Master of Arts, Area of Emphasis for Doctor of Education

The program leading to the M.A. in special education is designed to prepare master-clinical teachers of children and adults with special needs and to provide initial training for the preparation of future supervisors and administrators of public-school special education programs. The College of Human Resources and Education awards the Doctor of Education which may include an emphasis in special education. The Ed.D. with emphasis in special education is an individually prescribed program designed to prepare persons for roles in special education personnel preparation, supervision, administration, and applied research. The program also prepares professionals for emerging roles associated with interdisciplinary services to persons requiring special education, resources, or support for enhanced development. A particular focus of the program is the delivery of services in rural areas.

State certification standards require that students seeking licensure in special education (BD, LD, MI, gifted) hold general or vocational teaching certificates. Certifications in SPMI and preschool special needs do not require a general or vocational certificate.

Application

All applicants must comply with University, College, and program requirements. The teacher certification requirements are based on the 1985 Policy 5100 *Standards for Certification*.

Program Options

Behavioral disorders (K-12)*

Early intervention (pre-school special needs) (Pre K-K)

Gifted education (K-8; 5-12)

Mental impairments (mild and moderate) (K-12)*

Severe/profound Handicapped

*Changes in certification requirements mean that K-12 certification will be rare. Consult with your advisor to determine the grade levels of certification for which you will be eligible.

Admission

All students seeking certification and/or a degree must be admitted into the special education program. Students are admitted as regular, provisional, or non-degree students as follows:

Regular status: The individual who meets all admission requirements is granted regular status as a certification and degree seeking student.

Provisional status: The individual who has an earned baccalaureate degree from a regionally accredited college or university but who does not meet admission requirements may be granted provisional status in the program. This status allows the student an opportunity to remediate deficiencies in grade-point average or other requirements in order to achieve regular status. This status is most commonly afforded students with either no or insufficient training in education. Deficiencies must be made up within the first 18 hours of program credit.

Non-degree status: The individual who has an earned baccalaureate degree and teaching certificate from a regionally accredited college or university but who does not seek the master's degree may be admitted as a non-degree student. This status allows the student to take courses for professional development and for additional professional endorsement.

Regular status admission to the programs occurs when the following admission criteria have been met:

- An earned baccalaureate degree from a regionally accredited college or university.
- A minimum grade-point average of 2.75.
- Teaching certification in general or vocational education (except in severe/multiple disabilities or early intervention).

Certification

All applicants for certification must pass the content specialization test in their area of specialization, the PPST basic skills test, the appropriate PLT test and the microcomputer module. Contact your advisor at the Office of Student Advisory to clarify requirements and for timelines you must meet for certification.

Students who do not have a valid professional teaching certificate but who want certification in the various special education areas of specialization must meet the following criteria:

Practicum

To be eligible for practicum, students must meet the following requirements:

- Admission to the special education program and completion of all required course work in the area of specialization with an overall GPA of 3.0.
- Application for practicum submitted prior to midterm of the semester immediately preceding the one for which practicum is planned.
- Applicable criteria for one of the currently available practicum options.

Consult program for a complete list of practicum eligibility requirements.

Performance is assessed during course work and practicum experiences. A student who fails to achieve an acceptable level of performance in practicum will have his or her individual performance deficits reviewed and will be given the opportunity to repeat practicum once; such repetition may occur following completion of an indicated remediation and/or additional instruction. A student who does not meet acceptable levels of performance in the second practicum assignment is asked to withdraw from the program.

Retention in a program requires an overall 3.0 GPA.

Graduation Requirements

To be eligible for graduation, students must meet the following requirements:

- Completion of all required courses in the program of study with an overall GPA of 3.0.
- Passing score on the content specialization test in their area of specialization (except severe/multiple disabilities), the PPST, the PLT, and the microcomputer module.
- Enrollment in course work during the semester in which graduation is planned.
- Application for graduation submitted prior to midterm of the semester for which graduation is planned.

Applicants interested in one of the department program areas should contact the department chairperson for specific information on schedule and location of courses.

Curriculum Core

Master of Arts (36 Semester Hours Minimum)

A. Core Area Requirements (BD, LD, MI)	Hours
(12 semester hours in all master's degree programs)	
SPED 300 <i>Introduction to Special Education</i>	3
SPED 301 <i>Special Education Curriculum and Methods</i>	3
SPED 302 <i>Special Education Assessment</i>	3
SPED 303 <i>Classroom/Behavior Management: Special Education</i>	3
Total	12
B. Teacher Certification Behavior Disorders Area Requirements	
SPED 340 <i>Introduction to Behavior Disorders</i>	3
SPED 342 <i>Teaching Strategies: Behavior Disorders</i>	3
SPED 487 <i>Practicum: Behavioral Disorders</i>	3-6
Total	9-12
C. Teacher Certification Learning Disabilities Area Requirements	
SPED 330 <i>Introduction to Specific Learning Disabilities</i>	3
SPED 332 <i>Teaching Strategies: Specific Learning Disabilities</i>	3
SPED 487 <i>Practicum: Learning Disabilities</i>	3-6
Total	9-12
D. Teacher Certification Mental Impairments (Mild to Moderate) Area Requirements	
SPED 360 <i>Introduction to Mental Retardation</i>	3
SPED 362 <i>Teaching Strategies: Mental Retardation</i>	3
SPED 487 <i>Practicum: Mentally Retardation</i>	3-6
Total	9-12
E. Teacher Certification Gifted Education Area Requirements	
SPED 300 <i>Introduction to Special Education</i>	3
SPED 302 <i>Special Education Assessment</i>	3
SPED 370 <i>Introduction to Gifted Education</i>	3
SPED 372 <i>Teaching Strategies: Gifted Education</i>	3
SPED 487 <i>Practicum: Gifted Education</i>	3-6
Total	15-18
F. Additional Requirements for Master's Degree	
ED P 320 <i>Introduction to Research</i>	3
SPED 380 <i>Culminating Project</i>	3
SPED 382 <i>Computer Applications in Special Education</i>	3
Total	9
Planned Electives—(minimum for degree)	3-18
G. Teacher Certification Severe/Profound Handicapped Area Requirements	
SPED 320 <i>Curriculum: Severe Disabilities</i>	3
SPED 322 <i>Characteristics and Methods: Physical Disabilities</i>	3
SPED 323 <i>Family/Professional Collaboration: Developmental Disabilities</i>	3
SPED 324 <i>Classroom-based Communication Intervention: Developmental Disabilities</i>	3

SPED 325 <i>Secondary/Adult Programming:</i>	
<i>Severe Disabilities</i>	3
SPED 327 <i>Assessment: Developmental Disabilities</i>	3
SPED 328 <i>Instructional Programming:</i>	
<i>Developmental Disabilities</i>	3
SPED 329 <i>Managing Challenging Behaviors: Severe Disabilities</i>	3
SPED 487 <i>Practicum: Severe/Multiple Disabilities</i>	6
Total	30
H. Teacher Certification Early Intervention/Preschool Special Needs	
Area Requirements	
SPED 319 <i>Typical/Atypical Development: Early Intervention</i>	3
SPED 321 <i>Curriculum: Early Intervention</i>	3
SPED 322 <i>Characteristics and Methods: Physical Disabilities</i>	3
SPED 323 <i>Family/Professional Consultation: Developmental</i>	
<i>Disabilities</i>	3
SPED 324 <i>Classroom-based Communication</i>	
<i>Intervention: Developmental Disabilities</i>	3
SPED 326 <i>Program Management: Early Intervention</i>	3
SPED 327 <i>Assessment: Developmental Disabilities</i>	3
SPED 328 <i>Instructional Programming: Developmental Disabilities</i>	3
SPED 487 <i>Practicum: Early Intervention</i>	6
Total	30
Planned Electives (minimum for degree)	6
I. Problem or Thesis Area Requirements	
ED P 320 <i>Introduction to Research</i>	3
SPED 395 <i>Problem in Special Education or</i>	
SPED 497 <i>Research</i>	3-6
SPED 391 <i>Advanced Topics</i>	3
Total	9-12
Elective Requirements	12-15

Electives are to be approved by the student's advisor.

Doctor of Education

All applicants must comply with the requirements the University, the College, and the program. Additional entrance requirements are as follows:

- Completion of a master's degree and teaching certification in special education or disability services.
- Graduate grade-point average of 3.5.
- Three letters of reference addressing the candidate's past performance and qualities which would make the person suitable for doctoral-level study.
- Two years of work experience in special education or disability services.
- Submission of Graduate Record Examination or Miller Analogies scores in support of potential for success in doctoral-level study.
- Well defined goal statement.

Admissions are open year round and inquiries should be addressed to Chairperson, Doctoral Admissions Committee, Department of Educational Theory and Practice, College of Human Resources and Education, West Virginia University, P.O. Box 6122, Morgantown, WV 26506-6122.

Program of Study

Programs of study comply with all applicable institutional requirements, but typically they include course work in excess of the minimum college requirements because of the clinical nature of special education. Programs are designed by the doctoral student, the student's advisor, and the doctoral committee to best meet the student's career goals.

The leadership training provided through this program of studies draws on the many available strengths and resources of a major university. Development of research skills is a major focus of the program, along with advanced training related to the education, development, and habilitation of persons with exceptional needs. Normally, students take course work in a number of programs and colleges in order to take advantage of available interdisciplinary resources. The program encourages study and involvement with faculty from a broad range of disciplines in order to best prepare doctoral students to meet their individual career aspirations as leaders in special education.

Special Education (SPED)

250. *Survey of Exceptional Children and Adults*. 3 Hr. PR: Consent. Introduction to all areas of exceptionality. Definition, psychological and educational characteristics, and social and vocational adjustment.

255. *Introduction to Mental Retardation*. 3 Hr. PR: Consent. Historical, etiological, social, educational, and vocational aspects of mental retardation.

260. *Curriculum and Methods for Special Education*. 3 Hr. PR: SPED 250 and SPED 255 or consent. Organization of instruction, adaptation of teaching methods in several curricula areas and construction of materials.

262. *Curriculum and Methods for the Trainable Mentally Retarded*. 3 HR. PR: SPED 250 SPED 255 or consent. Special problems of curriculum development for the trainable child and adult and development of original construction of curricula materials.

280. *Student Teaching Clinical Experience in Special Education*. 1-6 Hr. PR: Consent. Student teaching with the mentally impaired.

281. *Special Problems and Workshop in Special Education*. 2-4 HR. PR: Consent. To take care of credits for special workshops and short intensive unit course on methods, supervision, and other special topics.

300. *Introduction to Special Education*. 3 hr. Comprehensive overview of exceptionalities which require special education.

301. *Special Education Curriculum and Methods*. 3 hr. Educational needs of students with mild/moderate learning problems in the categorical areas of retardation, behavior disorders, and learning disabilities.

302. *Special Education Assessment*. 3 hr. Development of expertise in various forms of cognitive and effective assessment techniques, understanding psychoeducational needs of exceptional learners, and designing appropriate educational prescriptions from assessment protocols.

303. *Classroom/Behavior Management: SPED*. 3 hr. Theory and classroom application of procedures to implement behavior changes in children with mild/moderate disabilities and/or problems; effective group and individual behavior management.

305. *Math Mentally Retarded*. 3 Hr.

306. *Reading Mentally Retarded*. 3 Hr.

319. *Typical/Atypical Development: Early Interventions*. II. 3 Hr. Characteristics of atypically developing children from birth through age six; causes and correlates of developmental delays and disabilities and at risk conditions during the prenatal, perinatal and postnatal periods; and strategies for promoting child development in early intervention programs.

320. *Curriculum: Severe Disabilities*. 3 hr. PR: Consent Focuses on evaluation of curricula and programs for severe and multiple disabilities. Task analysis and programming of longitudinal skill sequences are discussed for the following skill areas: pre-academics, academics, motor, self-help, and social.

321. *Curriculum: Early Intervention*. II. 3 hr. Design, implementation and evaluation of curricula and educational programs for young children with developmental delays and disabilities and at risk conditions; programming of skill sequences in motor development, socioemotional development, cognitive development, and preacademic content areas. (No pre- requisites).

322. *Characteristics and Methods: Physical Disabilities*. 3 hr. PR: Consent. Characteristics and educational implications of physical, neurological, and sensory impairments along with positioning, handling, and other management strategies, selection, design and use of adaptive equipment, training programs for feeding, toileting dressing, and motor skills.

323. *Family/Professional Collaboration: Developmental Disabilities*. 3 hr. Strategies and interpersonal skills for needs assessment, in-service training, conferencing, parental involvement, and interagency collaboration in educational programs for at-risk children, infants and preschoolers with delays, and other persons with severe disabilities.

324. *Classroom-based Language Intervention: Developmental Disabilities*. 3 hr. PR: Consent. Design and implementation of training programs for at-risk children, infants and preschoolers with delays, and persons with severe disabilities.

325. *Secondary/Adult Programming: Severe Disabilities*. 3 hr. PR: Consent. Focuses on the education of secondary-level and adult severe and multiple disabilities. Methods and materials in areas of vocational training, home living, community living, recreational and leisure skills, and sex education.

326. *Program Management: Early Intervention*. 3 hr. PR: Consent. Management skills to serve young children with disabilities, delays and at-risk based, self-contained, and mainstreamed models of early intervention.

327. *Assessment: Developmental Disabilities*. 3 hr. PR: Consent. Principles and practices of assessment, legal and ethical issues, individualized educational programs for at-risk children, infants and preschoolers with delays and persons with severe disabilities.

328. *Instructional Programming: Developmental Disabilities*. 3 hr. PR: Consent. The design, delivery, and evaluation of instruction for at-risk children, infants and preschoolers with delays and persons with severe disabilities.

329. *Managing Challenging Behaviors: Severe Disabilities*. 3 hr. Strategies for functional analysis, prevention, intervention, and crisis management, of self-injury, stereotypes, self-stimulation, noncompliance, and aggression; legal and ethical issues in management of problem behavior.

330. *Introduction to Specific Learning Disabilities*. 3 hr. PR: Consent. Historical, etiological, educational, and legislative aspects of, and multidisciplinary approaches to students with learning disabilities.

331. *Evaluating & Teaching the Specific Learning Disabled*. 3 Hr.

332. *Teaching Strategies: Specific Learning Disabilities*. 3 hr. PR: SPED 330 and SPED 331 and consent. Curriculum planning, informal diagnosis, techniques, teaching strategies in specific areas, opportunities to use strategies in student designed programs.

340. *Introduction to Behavior Disorders*. 3 hr. PR: Consent. Historical trends in the education of the behaviorally disordered child. Educational and behavioral management techniques and trends for the future.

341. *Behavior/ Dynmc Sch Cmnty*. 3 Hr.

342. *Teaching Strategies: Behavior Disorders*. 3 hr. Practical application of instructional methods for students with behavior disorders: assessment, management, and cognitive behavioral curriculum.

360. *Introduction to Mental Retardation*. 3 hr. Mental retardation from historical, etiological, and educational perspectives; the impact of PL94-142 on special education. (3 hr. lec.)
362. *Teaching Strategies: Mental Retardation*. 3 hr. Curriculum development based upon individual needs; application of classroom instructional methods for students with mild/moderate mental retardation.
365. *Administration and Supervision of Programs for Exceptional Children*. 3 hr. PR: Consent. Administration and supervision with attention to: selection and placement procedures; facilities and equipment; local, state, federal legislation; and philosophy and recent research. (Consult program for course offerings.)
370. *Introduction to the Gifted*. 3 hr. Introductory course concerning characteristics of gifted and talented children and implications these factors have for education. Definition, characteristics, history and philosophy of special programs, identification procedures, and development of program prototypes.
372. *Teaching Strategies: Gifted Education*. 3 hr. Development of qualitatively different educational experiences for gifted students. Models of differentiation in contents, process, and product in academic areas.
373. *Professional Development*. 1-6 Hr.
380. *Culminating Project*. 3 hr. PR: EDP 320 and consent. Completion of master's program; projects in applied research, curriculum development, or program design serve as exit examinations. (3 hr. lec.).
381. *Special Topics*. 1-6 hr. PR: Consent. Special topics or research in mental retardation and in exceptional children and adults.
382. *Computer Applications in Special Education*. 3 hr. PR: Consent. Implementing computer assisted instruction in the special education classroom; the computer as a tool to prepare and monitor instruction. (3 hr. lec.).
391. *Advanced Topics*. 1-6 hr. PR: Consent.
395. *Problem in Special Education*. 3 hr. Research for master's degree in special education.
397. *Research*. 1-15 hr.
470. *Advanced Professional Knowledge: Special Education*. 3 hr. Advanced foundations of special education and disability services; historical trends and philosophical perspectives; comparative international practices; policy formulation and analysis; and advocacy roles and activities.
471. *Personnel Preparation Strategies: Special Education*. 3 hr. Design, delivery and evaluation of preparation programs in special education and disability services; observation, supervision and evaluation of student teaching and practicum experiences; issues and trends in special education personnel preparation.
472. *Professional Writing/Grant Writing: Special Education*. 3 hr. Writing for professional publication in special education and disability services; review and editing of the written works of others; grant writing and review for private foundations or state and federal agencies.
474. *Analyzing/Interpreting Research: Special Education*. 3 hr. Research literature in special education and disability services; formulation of research questions; translation of research questions into appropriate research designs and proposals.
478. *Technology Research/Training: Special Education*. 3 hr. Review of research for computer-assisted instruction and applied technology with special populations; use of computer tools for research and productivity in special education and disability services; authoring computer-based materials with hypermedia programs.
479. *Current Issues/Trends: Special Education*. 3 hr. Analysis, discussion and research review of contemporary issues and trends in special education and disability services; selecting and defending a position on a variety of legal, ethical, social and programmatic issues.

480. *Seminar. I, II, S.* 1-6 hr. PR: Consent. Special topics concerned with the educational, sociological, and psychological aspects of special education.
483. *Internship in Professional Instruction.* 1-9 hr. PR: SPED 471. Supervised experience in design, delivery and evaluation of a college course in special education or disability services.
484. *Internship in Practicum Supervision.* 1-9 hr. PR: SPED 471. Supervised experience in observing, supervising and evaluating student teacher performance in a practicum setting in special education or disability services.
485. *Internship in Research.* 1-15 hr. PR: SPED 474. Supervised experience in design, conduct, analysis and report preparation of empirical, applied or policy analysis research in special education or disability services.
487. *Practicum: Severe/Multiple Disabilities.* 1-12 hr. PR: Departmental Approval. Internship, advanced student teaching in each certification area; administration and supervision practicum.
490. *Teaching Practicum.* 1-3 hr. PR: Consent. Intended for graduate students with college teaching responsibility. Provides a supervised experience in a teaching situation. (Graded as S/U).
491. *Advanced Study Project in Special Education.* 1-6 hr. Research for the program leading to the Certificate of Advanced Study in Special Education. (Consult program for course offering.)
492. *Directed Study.* 1-6 Hr.
493. *Special Topics.* 1-6 Hr.
494. *Special Seminars.* 1-6 Hr.
495. *Independent Study.* 1-6 Hr.
496. *Advanced Seminar.* 1-6 hr. PR: Consent. Designed to permit graduate students an opportunity to present research to the assembled faculty and graduate study body. (Graded as S/U.)
497. *Research.* 1-15 hr.
498. *Thesis.* 2-4 hr. PR: Consent. (Graded as S/U.)
499. *Colloquium in Special Education.* 1-6 hr. PR: Consent. For graduate students not seeking course work credit, but who wish to participate in academic programs.

Speech Pathology and Audiology

Conrad Lundeen, Chairperson
805 Allen Hall

Degree Offered:

Master of Science

Admission

Students applying for programs leading to degrees in speech pathology and audiology must comply with general WVU requirements and the requirements of the College of Human Resources and Education and of the Department of Speech Pathology and Audiology.

The Speech Pathology and Audiology Graduate Affairs Committee accepts those applicants they believe will be successful in the graduate program. The number of applicants accepted depends upon the number of qualified applicants, the size of the speech pathology and audiology graduate faculty, and the facilities available for acceptable academic, clinical, and research training. A minimum overall undergraduate grade-point average of 3.0 is required for consideration for admission.

The master of science degrees in speech pathology and audiology are competency-based programs. Students are expected to achieve a minimum competency level of B or S in each required course. If a student receives a grade of C or U (or lower) in a required course, he/she must meet with his/her academic advisor and/or academic graduate committee before beginning additional course work. The course instructor in conjunction with the academic advisor or committee will recommend the appropriate steps to meet the minimum standards of professional competency.

Requirements

In addition to the requirements listed in the Human Resources and Education introduction, the M.S. in Speech Pathology and Audiology requires:

- A minimum of 42 semester hours of approved graduate courses (including six hours of clinical practicum) in speech and hearing sciences, speech-language pathology, audiology, and other related areas to attain professional competence;
- Three semester hours of clinical practicum during each regular semester and two additional semester hours of practicum during the summer; six of these hours count toward the 42 semester hour requirement.
- A 3.0 grade-point average for all courses taken for credit toward the graduate degree.
- Successful performance during the last semester of graduate study on the NESPA examinations.
- Demonstration of professional competence in speech and/or hearing as measured by fulfillment of the academic and clinical practicum requirements established by the faculty.

A minimum of five consecutive semesters (including summer sessions) is required for master's candidates with a background in speech and hearing. For candidates without a background in speech and hearing, a minimum of seven semesters is required for completion of the master's degree.

The Department of Speech Pathology and Audiology is accredited by the Council on Academic Accreditation in Audiology and Speech-Language Pathology for both the speech-language pathology and audiology training programs.

Speech Pathology and Audiology (SPA)

210. *Manual Communication*. I, II. 3 Hr. PR: Consent. Development of skills needed to communicate in sign language. The manual alphabet, basic number concepts, and the basic vocabulary of traditional American signs.

212. *Intermed Manual Communication*. II. 3 Hr. PR: SPA 210 or consent. Improve skills needed to communicate in sign language. Includes increasing sign language vocabulary, practicing finger spelling, and communicating with signs.

218. *Hearing Screening Programs*. I. PR: SPA 50 or consent. 3 hr. Disorders of hearing; screening programs from birth through geriatrics; introduction to industrial programs.

223. *Aural Rehabilitation*. II. 3 Hr. PR: SPA 243 or consent. Communication and hearing impairment; aural rehabilitation evaluation; remediation including amplification, auditory and visual training, and ALD's.

243. *Audiological Assessment*. I. 4 Hr. PR: SPA 151 and SPA 218. Application of basic audiological techniques, including puretone and speech audiometry, masking, and immitance testing. Audiometric skill development in computer simulation lab.

250. *Communication Disorders*. I, II, S. 3 hr. (For Non-Majors). Survey of normal processes and disorders of speech, language, and hearing in children and adults. Intended for students and teachers in early childhood, elementary, secondary and special education; language arts specialists; child development specialists; psychologists; and rehabilitation specialists.

254. *Language Acquisition*. I. 3 Hr. PR: SPA 150 and SPA 153. Normal processes involved in the acquisition of language, including the development of phonological, semantic, morphological, pragmatic, and syntactical systems. Application of these processes to the diagnosis and treatment of language disorders.

255. *Articulation and Cleft Palate*. II. 3 Hr. PR: SPA 153. Characteristics and etiology of articulatory and phonological disorders; survey of diagnostic and therapeutic procedures. Characteristics of articulation and resonance, and survey of evaluation and treatment considerations for cleft palate.

256. *Voice and Stuttering*. II. 3 Hr. PR: SPA 50 and SPA 255. Basic knowledge about and understanding of voice disorders and stuttering; relevant theories, facts, research findings, and clinical practice related to the epidemiology, etiology, course, prevention, diagnosis, and remediation.

257. *Clinical Programs in Schools*. I. 3 HR. PR: SPA 254 and SPA 255. Organization and structure of clinical programs in public school settings. Discussion of state and federal regulations, case selection, scheduling, program planning, and other administrative and programmatic matters.

258. *Language Disorders*. II. 3 hr. PR: SPA 254. The nature and etiology of child and adult language disorders are described. Assessment and remediation procedures are examined.

265. *Parent Programs Comm. Disorders*. II. 3 hr. Students will learn to organize and implement parent involvement programs in a variety of settings, interview parents, conduct conferences, utilize appropriate materials, and interact effectively with parents of communicatively handicapped children in various practica experiences.

278. *Clinical Observation/SLP*. I, II. 1 hr. PR: SPA 50 or consent. Introduction to clinical procedures and issues in speech-language pathology, including professional ethics, certification requirements, assessment/treatment process variables, clinical observations, behavioral objectives, and cues and feedback.

279. *Clinical Observation/Audiology*. I, II. 1 HR. PR: SPA 50 or consent. Introduction to clinical procedures and issues, including professional ethics, certification requirements, assessment/treatment process variables, clinical observations, behavioral objectives, and cues and feedback.

280. *Professional Writing/Speaking*. I. 3 hr. (For Majors Only). PR: (ENGL 1 and ENGL 2 and SPA 80) or consent. Designed for improvement of student's professional skills, specifically oral and written. Emphasis is placed on report writing, letter writing, resume writing, listening, interviewing, group problem solving, leadership, persuasion, and public speaking.

281. *Special Topics*. I, II, S. 1-6 Hr. per sem; (max. 6 hr.). PR: Consent. Independent study in speech language pathology, audiology, and speech language and hearing sciences.

282. *Clinical Practice/SLP*. I, II, S. 3 hr. PR: Consent. Orientation to clinical methods for evaluation and treatment of speech-language disorders.

283. *Clinical Practice/Audiology*. I, II, S. 3 hr. PR: Consent. Orientation to clinical methods for evaluation and treatment of hearing disorders.

285. *Hearing-Impaired School Child*. 3 hr. Audiology in the public school classroom; remediation for the hearing-impaired child.

305. *Rural Issues in Sp-Lang Path*. II 2 Hr. Presentation and discussion of issues related to the practice of speech-language pathology in rural school systems.

320. *Introduction to Research*. I. 3 hr. PR: Consent. Discussion of research, including experimental design and data analysis in speech-language pathology, audiology and speech, language, and hearing sciences.

321. *Structure and Function of the Auditory System*. I. 3 hr. PR: Consent. Detailed study of the gross and microscopic anatomy of the auditory system, and detailed investigation of physiological aspects of auditory sensitivity and acuity.

322. *Advanced Audiological Assessment*. I. 3 hr. Various audiological techniques utilized in differential diagnosis of auditory dysfunction. Administration and interpretation of diagnostic techniques.

323. *Advanced Study: Aural Rehabilitation*. 3 hr. Identification of candidates for aural rehabilitation; evaluating degree of handicap; introduction to speech, language, education, and academic achievement of hearing impaired children; auditory, visual, and combined methods of rehabilitation; aural rehabilitation counseling.
324. *Central Auditory Disorders*. 3 hr. PR: SPA 322 or consent. Pathology and audiometric site-of-lesion testing of the central auditory nervous system.
325. *Hearing Aids*. I. 3 hr. PR: SPA 322. Electronic design of amplification systems and acoustics of amplification systems. Hearing aid evaluation procedures.
326. *Pediatric Audiology*. S. 3 hr. A study of the development of the auditory response and hearing problems of early childhood. Student will learn the construction and application of specialized assessment techniques suitable for the pediatric patient.
327. *Pathologies of the Auditory System*. S. 3 hr. PR: Consent. Investigation of the nature and etiology of auditory system pathologies from the external ear to the auditory cortex and their audiological manifestation.
330. *Industrial and Environmental Audiology*. II. 3 hr. A study of various noise parameters, instrumentation for noise measurement, and measurement techniques. Effects of noise on man and industrial hearing conservation procedures are discussed.
340. *Experimental Phonetics*. S. 3 hr. PR: SPA 150 and SPA 151 or consent. Discussion of contemporary topics in the speech and hearing sciences, including acoustic, physiological, and perceptual phonetics.
341. *Advanced Hearing Science*. II. 3 hr. Audiological instrumentation and competency in calibration, maintenance, trouble shooting, minor repair, and use of instrumentation.
343. *Neurophys of Speech/Language*. I. 3 hr. PR: SPA 150 and SPA 258 or consent. General and typographic anatomy and physiology of CNS, with special attention to motor and sensory systems as they apply to speech, hearing, and language.
344. *Neuropath of Speech/Language*. S. 3 hr. PR: SPA 343. Explores methods of identifying and treating speech and language problems associated with nonprogressive and progressive neurological disorders.
350. *Speech and Language Disorders: Assessment-Remediation*. I, II. 3 hr. PR: SPA 250 or consent. Familiarizes the student with the following aspects of speech and language disorders: causes, characteristics, assessment, remediation techniques, and their incorporation into individualized educational programs.
351. *Advanced Voice Disorders*. I. 3 hr. PR: SPA 256 or consent. Advanced study of the vocal and respiratory mechanisms; epidemiology, classification, etiology, symptomatology, assessment, prevention, and remediation of voice disorders.
352. *Advanced Stuttering Disorders*. II. 3 hr. PR: SPA 256 or consent. Advanced study of the symptomatology, epidemiology, etiology, research findings, assessment, prevention, and remediation of stuttering and related fluency disorders.
353. *Adult Neurogenic Comm. Dis.* II. 3 hr. PR: SPA 343. Explores normal adult language processes and the effect of normal aging on communication. Advanced investigation of the etiology, diagnosis, nature, and therapeutic approaches of aphasia, agnosia, apraxia, dysarthria, dementia, right hemisphere impairment, and traumatic brain injury.
355. *Advanced Study: Cleft Palate*. II. 3 hr. PR: SPA 255 or consent. Investigation of the etiology, diagnosis, nature, and therapy approaches of communicative disorders in persons with cleft palate.
356. *Phonological Disorders*. I. 3 hr. PR: SPA 255 or consent. Advanced study of the etiology, assessment, and treatment of phonological disorders in children and adults.
357. *Professional Issues*. II. 2 hr. PR: SPA 320 or consent. Discussion of contemporary professional issues in speech-language pathology and audiology.

360. *Language Disorders in Children: Assessment*. S. 3 hr. PR: SPA 254. Assessment procedures utilized to identify children with language disorders. Standardized tests and non-standardized analysis procedures are introduced.

361. *Language Disorders in Children: Treatment*. S. 3 hr. PR: SPA 360 or consent. Treatment procedures for children with language disorders are presented. Clinician-oriented and client-oriented approaches are emphasized.

370. *Augmentative/Alternative Comm*. I. 3 Hr. Discussion of augmentative/alternative communication options for persons who are unable to meet their daily needs through natural modes of verbal, manual, or written communication. Demographics, assessment, and treatment of candidates for AAC interventions.

371. *AAC Technology*. II. 3 hr. PR: SPA 370 or consent. Provides training and experience in the utilization of augmentative/alternative communication technology for persons who are unable to meet their daily needs through natural modes of verbal, manual, or written communication.

373. *Professional Development*. I, II, S. 1-6 Hr. (May be repeated for credit.) PR: Department consent. Specially designed experiences for those interested in advancing professional skills in a particular specialty. (Graded as S/U. - Not for degree credit in programs in the College of Human Resources and Education.)

382. *Advanced Practice/SLP*. I, II, S. 1-6 hr. PR: Consent. Supervised clinical practicum that concerns the evaluation and treatment of children and adults with speech-language disorders.

383. *Advanced Practice/Audiology*. I, II, S. 1-6 hr. PR: Consent. Supervised clinical practicum that concerns the evaluation and treatment of children and adults with hearing disorders.

384. *Externship in SPA*. I, II, S. 1-9 hr. Supervised clinical practicum experience in selected work settings to provide students with a concentrated orientation to the professional work place. Coordination and evaluation is under the direction of faculty.

387. *Special Topics*. I, II, S. 1-5 hr. (May be repeated for credit.) PR: Consent. Open to graduate students in speech pathology and audiology who are pursuing independent problems in that field.

391. *Advanced Topics*. 1-6 Hr.

397. *Research*. 1-15 Hr.

480. *Seminar*. I, II, S. 1-6 hr. PR: Consent. Topics vary from semester to semester to meet student needs. Organic speech impairment, speech pathology research, aural rehabilitation research, medical audiology research, etc.

490. *Teaching Practicum*. 1-3 Hr.

491. *Advanced Study*. 1-6 Hr.

492. *Directed Study*. 1-6 Hr.

493. *Special Topics*. 1-6 Hr.

494. *Special Seminars*. 1-6 Hr.

495. *Independent Study*. 1-6 Hr.

496. *Graduate Seminar*. 1 Hr.

497. *Research*. I, II, S. 1-15 hr.

498. *Thesis*. 2-4 Hr.

499. *Colloquium*. 1-6 hr. PR: Consent. For graduate students not seeking course work credit but who wish to retain all the rights and privileges of duly enrolled students. Enrollment entitles students to consult with graduate faculty, use the University's facilities, and participate in its academic and cultural programs. Colloquium credits may not be counted towards Master's degree requirements. Grading is S/U.

Technology Education

Degree Offered:

Master of Arts

Area of emphasis for Doctor of Education

The program includes the study of technology, the relation of technical systems to the civilization process, and the implications of changes in these systems on the quality of life and the education of citizens. Technology, in its simplest definition, is the study of human techniques for making and doing things, and is primarily concerned with the when, where, how, and why of such techniques, interpreting them in a social context. The goal of the program is an increased level of understanding about technological systems in order to provide the basis for controlling, directing, and redirecting these systems for the benefit of humankind. Faculty and students in the program are committed to a continuing investigation of the impact of technology on people and society—including education and the environment. Because such an interdisciplinary study of technology dictates a wide exposure to other disciplines, students are encouraged to take advantage of educational opportunities in other departments within the University community.

Students from all regions of the United States and several other countries are engaged in graduate study at the master's or doctoral level. Their undergraduate preparation varies, ranging from technical fields such as engineering, industrial technology, and safety studies to fields such as speech communication, art, and theology.

The program is involved in the Academic Common Market of the SREB (Southern Regional Education Board). Students from the southern region (thirteen southern states) should inquire about instate tuition. Graduate assistantships are frequently available at both the master's and doctoral levels. Information is available upon request.

Admission

All applicants must comply with the general WVU requirements and the requirements of technology education. Admission to the program is contingent upon assessment of official transcripts of all higher education work attempted, letters of recommendation, and the Miller Analogies Test or Graduate Record Examination.

In addition to the study of the interaction between technology and culture, the department has three major technical areas of concentration. Students are expected to focus their course of study on one of these areas:

- **Communication and Information Systems**—Study of visual, acoustical, telecommunication, and computer systems including the analysis of information transfer and its social/cultural impact.
- **Transportation Systems**—The study of air, space, terrestrial, and marine systems, including components and social, cultural and environmental impacts.
- **Production Systems**—The study of manufacturing, construction, and processing systems, including the social/cultural impact of the industrial revolution, automation, and cybernation.

Students may also include in their plans of study special themes related to technology including appropriate technology, curriculum and instructional design in the technologies, energy, environment, international development, public policy, technology assessment, technology and culture, and technology transfer.

Master’s Areas of Emphasis

The master’s degree enables students to select an emphasis of study based on their individual interest, goals, and objectives within the cohesive theme of the study of technology. The program culminates in a master of arts degree in technology education.

Each student’s program of study outlines the major courses and activities which the student pursues while engaged in graduate study. It is designed by the student in consultation with a faculty advisor. Programs of study are developed with concentrations in professional development, communication and information systems, or technology and society. Specific emphasis can be placed in areas such as appropriate technology and international or community development.

All master’s programs have requirements related to the discipline as well as areas of specialization. Typical master’s degree program requirements are ten core credits, 15 credits in the area of the specialization, and 12 credits in the area of research. Specific courses and activities in each of these categories are listed as follows:

Communication And Information Systems

Core Courses

Semester Hours	Required	Elective
T E 281 <i>Introduction to Technology</i>	3	
T E 344 <i>Technology and Society</i>	3	
T E 384 <i>Interdisciplinary Seminar</i>	3	
T E 496 <i>Graduate Seminar</i>	1	
Total	10	

Specializations

T E 310 <i>Contemporary Problems in Communication</i>	3	
T E 311 <i>Technical Development in Communication</i>	3	
T E 365 <i>Computer Mediated Communication</i>	3	
T E 372 <i>Development of Instructional Materials</i>		3
T E 385 <i>Practicum: (a) internship in business, or (b) curriculum development</i>		3
Totals	9	6**

Research

ED P 320 <i>Introduction to Research</i> ***	3	
T E <i>Advanced Studies</i>	3	
T E 397 <i>Master’s Degree Research</i>	6	
Total	12	
Totals	28	9
Total Minimum Semester Hours		37

Professional Development

Core Courses

T E 281 <i>Introduction to Technology</i>	3
T E 344 <i>Technology and Society</i>	3
T E 384 <i>Interdisciplinary Seminar</i>	3
T E 496 <i>Graduate Seminar</i>	1
Total	10

Specializations

T E 300 <i>Contemporary Problems in Transportation or</i>	
T E 301 <i>Technical Developments in Transportation</i>	3
T E 310 <i>Contemporary Problems in Communication or</i>	
T E 311 <i>Technical Developments in Communication</i>	3
T E 320 <i>Contemporary Problems in Production or</i>	
T E 321 <i>Technical Developments in Production</i>	3
T E 371 <i>Technology Education Curriculum Development</i>	3
Electives	6
Total	9 6 [†]

Research

ED P 320 <i>Introduction to Research</i> [†]	3
T E P 391 <i>Advanced Studies</i>	3
T E 397 <i>Master's Degree Research</i>	6
Total	12
Totals	31 6
Total Minimum Semester Hours	37

Technology and Society

Core Courses

T E 281 <i>Introduction to Technology</i>	3
T E 344 <i>Technology and Society</i>	3
T E 384 <i>Interdisciplinary Seminar</i>	3
T E 496 <i>Graduate Seminar</i>	1
Total	10

Specialization

T E 245 <i>Women in International Development</i>	3
T E 280A <i>Shelter Design</i>	3
T E 280B <i>Renewable Energy Systems</i>	3
T E 320 <i>Contemporary Problems in Production</i> [*]	3
T E 355 <i>Technology and Environment</i>	3
T E 357 <i>Alternative Futures</i>	3
T E 390 <i>A Technology and Community Development</i>	3
T E 390B <i>Technology and Third World Development</i>	3
Total	9 6 ^{**}

Research

ED P 320 <i>Introduction to Research</i> ^{***}	3
T E 391 <i>Advanced Studies</i>	3
T E 397 <i>Master's Degree Research</i>	6
Total	12
Totals	31 6
Total Minimum Semester Hours	37

* A minimum of six semester hours of graduate work in the department must be completed prior to taking this course.

** Three semester hours of the electives can be taken outside of the technology education department.

*** Or approved substitutions.

Doctor of Education

A plan of study leading to the doctor of education is designed by the student in conjunction with an advisor and faculty committee. The course of study is based on stated philosophy and objectives. Once the plan of study is approved, it becomes a contract between the student and the graduate faculty. Each personal program must include at least two continuous semesters of full-time, in-residence study. A minimum of 72 semester hours beyond the bachelor's degree and a research dissertation are required.

The curriculum is oriented toward the development of professional competencies rather than specific course requirements. Generally, the competencies include the ability to interpret and to initiate scholarly research in the discipline of technology, a knowledge of significant technical developments in at least one area of concentration, an understanding of the historical development, cultural impact, and future implications of technology, the ability to develop effective instructional programs in the technologies, and the ability to integrate information from various sources in solving socio-technical problems.

Core Courses

T E 300	<i>Contemporary Problems in Transportation and</i>	..... 3
T E 301	<i>Technical Developments in Transportation or</i>	..... 3
T E 310	<i>Contemporary Problems in Communication and</i>	.... 3
T E 311	<i>Technical Developments in Communication or</i>	... 3
T E 320	<i>Contemporary Problems in Production and</i>	..... 3
T E 321	<i>Technical developments in Production and</i>	..... 3
T E 384	<i>Interdisciplinary Seminar</i>	..... 3
T E 400	<i>Technology: Its History and Development</i>	..... 3
T E 404	<i>Readings in Technology and Culture</i>	..... 3
T E 405	<i>Innovation and Invention</i>	..... 3
T E 491	<i>Advanced Studies</i>	..... 3
T E 496	<i>Graduate Seminar</i>	..... 1

Technology Education (T E)

245. *Women in International Development.* 3 Hr. To examine the cultural diversities in the definition of women's roles and status, to investigate women's access to education, health, income, credit and technology, and to study women's health, income, credit and technology, and to study women's contributions in third world development.

280. *Special Problems and Workshops.* I, II, S. 1-6 hr. To provide credits for special workshops and short unit courses on special topics.

281. *Introduction to Technology.* 3 hr. An introduction to selected technical concepts and the evolution of the technical systems of transportation, communication, and production, with a focus on the relationship of these systems to technological change and the civilization process.

300. *Contemporary Problems in Transportation.* 3 hr. Technical and social/cultural problems related to efforts in the development and utilization of new and improved modes of transportation.

301. *Technical Developments in Transportation.* 3 hr. Selected developments in transportation technology. Principles, concepts, and processes fundamental to the design and development of transportation systems.

310. *Contemporary Problems in Communication.* 3 hr. Technical and social/cultural problems related to efforts in the development and utilization of new and improved modes of communication.

311. *Technical Developments in Communication.* 3 hr. Selected developments in communication technology; identification of principles, concepts, and processes fundamental to design and development of communication systems.

312. *Distance Education*. II. 3 Hr. This course addresses the nature of technical communication systems in distance education; their configuration and behavior, and the organizational factors associated with their development, acquisition, use, evaluation, and maintenance.

320. *Contemporary Problems in Production*. 3 hr. Technical and social/cultural problems resulting from efforts in the development and utilization of new and improved methods of producing goods and services.

321. *Technical Developments in Production*. 3 hr. Selected developments in production technology; identification of principles, concepts, and processes fundamental to the design and development of production systems.

330. *Contemporary Problems in Research and Development*. 3 hr. Research and investigation about transportation, communication, and production systems; technical and social/cultural problems related to research and development efforts.

344. *Technology and Society*. 3 hr. An analysis of the relationship of technical means, change, and society. Emphasis is on the influence of technical change on social institutions and culture in various societies.

351. *Contemporary Problems in Technology*. 3 hr. An analysis of current technical and social problems associated with the design, selection, and collective use of technical devices and systems.

355. *Technology and Environment*. 3 hr. A study of communication, production, and transportation systems, their impact on the environment and the analysis of resource management, machines and processes, energy use, health, and resource recovery related to these systems. resource recovery related to these systems. related to these systems.

356. *Energy and Society*. 3 hr. An analysis of world energy resources and the problems associated with retrieval and conversion. Includes an analysis of the related social problems of citizen awareness, citizen responsibility, and public policy.

357. *Alternative Futures*. 3 hr. An overview of forecasting methods with group and individual activities using selected techniques to gain information about the future. Emphasis is on the design and redesign of technical systems for social purpose.

360. *Technical Concepts: How Things Work*. 3 hr. A study of the principles and components of technical devices. An analysis of mechanical, electrical, optical, acoustical, chemical, and pressure elements of technical systems.

365. *Computer Mediated Communication*. 3 Hr. Internet. This course will address the fundamental mechanics of using computers to access information networks for application in elementary, secondary, and higher education classroom instruction, as well as other education/business teaching/ learning environment.

371. *Curriculum Development and Physical Facility Design*. 3 hr. Development of curriculum components for the study of technology and the selection of facility design related to curricula requirements.

372. *Development of Instructional Materials*. 3 hr. Design and development of media and instructional units for education in the technologies.

373. Professional Development. I, II, S. 1-6 hr. (May be repeated. Graded S or U. Not for degree credit). PR: Consent. Specially designed experiences for those interested in advancing professional skills in the study of technology.

374. *Technology Education: Elementary School*. 3 hr. An overview of technology, its role in society and its place in elementary curricula. Approaches to teaching technology as content and the integration of projects and activities into the elementary-school curriculum.

376. *Technology Education: Middle School*. 3 hr. An overview of technology-related content appropriate for learners, age 10-14. Emphasis is on designing units and courses of study and the selection of instructional methods and materials.

378. *Technology Education: Secondary Schools*. 3 hr. An overview of the content appropriate in technology courses for learners aged 14 and 18. Emphasis on designing units and courses of study and the selection of instructional methods and materials.
384. *Interdisciplinary Seminar-Technology and Culture*. 3 hr. An analysis of the relationship between individuals, society, and technical systems. Guest presenters assist students in an examination of technology from the perspective of various disciplines.
385. *Practicum*. I, II, S. 1-12 hr. PR: Consent.
390. *Special Topics*. I, II, S. 1-6 hr. PR: Consent.
391. *Advanced Topics: Research Methods*. I, II, S. 1-6 hr.
397. *Research*. I, II, S. 1-15 hr.
400. *Technology: Its History and Development*. 3 hr. Major technical periods in the civilization process and the interrelationships of technological developments to the social/cultural milieu.
403. *Design in Technology*. S. 3 hr. Study of the design of technical products and systems.
404. *Readings in Technology and Culture*. 3 hr. Fundamental, historical, and contemporary ideas of the nature of technology as an area of created knowledge.
405. *Innovation and Invention*. 3 hr. A study of the innovation and invention process.
465. *Internet for Educational Research*. 3 hr. An introduction and exploration into the use of computer mediated Communication (CMC) for conducting educational research and as a learning/teaching tool.
480. *Projects in Technology*. I, II, S. 1-6 hr. PR:Consent.
481. *Problems in Technology*. I, II, S. 1-6 hr. PR:Consent.
490. *Teaching Practicum*. I, II, S. 1-3 Hr. PR:Consent.
491. *Advanced Study: Research Methods*. 1-6 Hr. PR: Consent.
492. *Directed Study*. I, II, S. 1-6 hr. PR: Consent.
493. *Special Topics*. I, II, S. 1-6 hr. PR: Consent.
494. *Special Seminars*. I, II, S. 1-6 hr. PR: Consent.
495. *Independent Study*. I, II, S. 1-6 hr.
496. *Graduate Seminar*. I, II, S. 1 Hr. PR: Consent.
497. *Research*. I, II, S. 1-15 hr. PR: Consent.
498. *Thesis*. I, II, S. 2-4 hr. PR: Consent.
499. *Graduate Colloquium*. 1-6 Hr.

Perley Isaac Reed School of Journalism

William T. Slater, Ph.D., Dean

R. Ivan Pinnell, Ph.D., Associate Dean

Kurt Schimmel D.B.A., Interim Director of Graduate Studies

The master of science in journalism (M.S.J.) is a program of the School of Journalism, located on the downtown campus in Martin Hall, WVU's oldest building (constructed in 1870). Martin Hall was renovated, refurbished and equipped in 1976-77.

Today, the school has modern broadcast news facilities and state-of-the-art electronic reporting and editing systems. The faculty, through their educational and professional backgrounds in mass communications studies and media-related experiences, are highly qualified to teach mass communications at both the undergraduate and graduate levels. About one-half hold terminal degrees.

The master's program has granted more than 200 degrees since its first, in 1962. The School of Journalism, established in 1939 and one of the oldest in the United States, is one of approximately 100 such programs accredited by the Accrediting Council on Education in Journalism and Mass Communications. The school has a total of more than 4,000 graduates, the majority of whom have careers in newspaper journalism, broadcasting, advertising, public relations, or related fields.

Master's Program

The master's program offers students the choice of two tracks—the teaching-research track for persons who wish to go on for a doctoral degree, and the professional track for those who wish to enhance their professional opportunities in some area of mass communications.

The program, designed to help each student reach full potential as a practitioner, teacher, or scholar in mass communications, prepares a graduate not only for a first job—those who obtain the master's degree should excel in the skills of the profession—but also for long-term productive career development through the study of mass communications and related fields.

The school is in the process of developing more specialized curricula for persons who aspire to become news or public relations specialists in such fields as business, energy and the environment, science, social relations, education, government, international affairs, and sports.

Assistantships

Assistantships available in and through the school each year pay stipends and usually provide tuition remission. Graduate assistants teach laboratories and assist professors with courses. Some work in media-related positions in other programs at WVU.

Admission

Those interested in learning about and applying to the master's program should contact the dean, associate dean or graduate director: School of Journalism, 112 Martin Hall, Box 6010, West Virginia University, Morgantown, WV 26506-6010, Telephone: (304) 293-3505.

Graduate Faculty

† Indicates regular membership in the graduate faculty.

* Indicates associate membership in the graduate faculty.

Professors

†William O. Seymour, M.A. (E. Tex. St. U.). Photojournalism.

Associate Professors

†R. Ivan Pinnell, Ph.D. (U. Denver). Public relations.

†Richard A. Schrieber, Ph.D. (U. Iowa). Creative advertising, Communication theory.

*Pamela D. Yagle, M.S.J. (WVU). Reporting, Language skills, High school publications.

Assistant Professors

*Ralph E. Hanson, Ph.D. (Ariz. St. U.). Reporting, Editing, News and feature writing.

*Theodore Lustig, M.A. (NYU). Public relations

Christine M. Martin, M.A. (U. Maryland). News and feature writing, Journalism history.

Maryanne Reed, M.A. (Northwestern U.). Broadcast news.

Ron Schie, M.F.A. (Ohio U.). Advertising media, Copy, Campaigns.

Kurt Schimmel, D.B.A., (Cleveland State). Research, Quantitative research, Advertising.

Emeriti Professors

Paul A. Atkins, M.A. (U. Va.).

Charles F. Cremer, Ph.D. (U. Iowa).

Harry W. Elwood, M.S. (Northwestern U.).

Guy H. Stewart, Ph.D. (U. Illinois). Dean.

William R. Summers, Jr., M.A. (U. MO.).

The master of science in journalism (M.S.J.) program in the Perley Isaac Reed School of Journalism is designed to help persons involved in the various aspects of mass communication better understand and cope not only with the increased complexity of their own field, but also with fields outside mass communication.

The program, designed to help each student reach full potential as a worker, teacher, or scholar in mass communication, helps prepare a student not only for a first job—although students who obtain the M.S.J. degree should excel in the skills of the profession—but also for long-term and productive career development through the study of mass communication and related fields.

The M.S.J. program is intended to afford liberal arts graduates an opportunity to concentrate advanced study in mass communication; provide intensive study for persons who have undergraduate journalism training, but who wish to pool their journalistic skills with extensive knowledge in another substantive area or areas (e.g., political science, economics, science); and give persons who have had considerable professional experience an opportunity to broaden their academic bases through carefully selected advanced studies.

Admission

Admission to the M.S.J. program is limited to holders of baccalaureate or equivalent degrees from institutions of higher learning. Applicants should have combined verbal and quantitative scores on the Graduate Record Examination (GRE) Aptitude Test of at least 1000 and overall grade-point averages (GPA) of at least 3.0 on a 4.0 scale. Each applicant also should submit to the director of graduate studies in the School of Journalism a detailed essay explaining why the student wants to undertake graduate study in journalism, what the student hopes to get from the graduate journalism program, what the long-term goals are, and how graduate education in journalism can help achieve those goals.

An applicant who doesn't meet the minimum GRE and/or GPA requirement(s) may be accepted only if the low GPA or GRE scores are offset by other factors. Excellent recommendations, unusual grading patterns (e.g., a steady rise of grades), an outstanding statement of purpose, or examples of professional accomplishment sometimes can offset low GRE scores or a low GPA.

Students applying for admission to the M.S.J. program are encouraged to send non-returnable supporting material to the director of graduate studies in the School of Journalism. Examples of published or unpublished writing, research, or photography, a detailed listing of professional media experience or other relevant job experience, and other supporting materials will be considered by the admissions committee. All other materials (e.g., transcripts, GRE scores, application forms) should be sent to the Office of Admissions and Records.

Additional Requirements

A student who does not have a bachelor's degree in journalism or extensive professional experience must meet these additional requirements:

- Must have completed a core of journalism courses, with subjects and grades acceptable to the School of Journalism, or
- Must complete undergraduate journalism and other courses to be prescribed by the School of Journalism, or
- Must demonstrate knowledge and competence in a number of journalism topics to be prescribed by the School of Journalism, or
- Must meet a combination of the foregoing requirements.

Application

All applications for admission are considered by the committee on graduate studies. The director of graduate studies advises all students about general problems and concerns, courses to take, projects to undertake, special training to obtain, and appropriate outside areas for study.

Plan of Study

Early in the student's program, usually by the completion of six-to-nine credit hours of graduate course work, the student and the advisor draw up a plan of study to show the direction of the student's course work. The plan may also indicate a general time frame anticipated for the completion of this work and may contain the direction and outline of the research problem to be undertaken. This plan of study becomes a part of the student's record, and constitutes, with some degree of specificity, the terms and conditions that the student must meet for completing the degree requirements. Subsequent changes in the plan of study must be approved by the student and the advisor, and no graduate student may take a course S/U or Pass-Fail without written permission of the graduate director.

Assistantships

Approximately five assistantships and/or internships are available in and through the School of Journalism each semester. Graduate assistants teach laboratories and assist professors with their courses. Interns work in mass communication-related jobs on campus to obtain solid professional experience.

Tuition Waivers

Students receive stipends for the academic semester and may apply for tuition remission for the entire year. Although sometimes renewed for a second or third semester, assistantships and internships are granted for one academic semester. Graduate assistants and interns work an average of 20 hours per week during the academic year.

Persons who want to be considered for assistantships or internships should have their applications on file with the director of graduate studies in the School of Journalism before March 1.

Emphases

The School of Journalism offers two areas of emphasis—the teaching-research track and the professional track—within the M.S.J. program.

Teaching/Research - The teaching-research track is generally a program for persons who want to go on for a Ph.D. degree, teach in a community college, or conduct research in some areas of mass communication. Persons in the track normally take research and theory courses both inside and outside the School of Journalism, statistics, and social science courses. The program culminates in a thesis, which is a scholarly study of an important aspect of mass communication.

Professional - The professional track is designed primarily for persons who wish to become excellent practitioners in some field of mass communication and who have little desire to teach or become mass communication researchers. Persons in the professional track normally take communication and outside area courses that will help them become better practitioners. The program culminates in a professional project, which helps a student extend his or her knowledge about a given aspect of mass communication but which should be the sort of nonroutine project on which the student might work as a professional.

Time Limitation

Students must complete all requirements for their degrees, including either a thesis or professional project within four years of the start of the first course work in their programs.

Requirements

For the master's degree in journalism, the student must meet the following requirements:

Teaching/Research - A minimum of 30 semester hours of acceptable graduate credit, including a thesis for six hours of credit.

- As part of the 30 hours, a minimum of 18 hours, including the thesis, in School of Journalism courses.
- Included in the 30 hours, students may take nine hours in a minor conducted outside the School of Journalism.

Professional - A minimum of 30 semester hours of acceptable graduate credit, including a professional project for six hours of credit.

- As part of the 30 hours, a minimum of 18 hours, including the professional project, in School of Journalism courses.
- Included in the 30 hours, students may take nine hours in a minor conducted outside the School of Journalism.

In either program, the candidate is allowed to take more than the minimum required number of hours.

All Students - The following courses are required for all journalism graduate students:

- JRL 300 *Introduction to Graduate Studies* (no credit);
- JRL 304 *Mass Media and Society* (3 HR.);
- JRL 320 *Advanced Journalistic Writing and Research* (3 HR.); and
- JRL 401 *Research Methods* (3 HR.).

In both programs, 60 percent of the graduate credits submitted for the degree must be in courses numbered 300 or above.

Course work must be completed with a minimum grade-point average of 3.0. The thesis and professional project are graded as S or U (Satisfactory or Unsatisfactory).

Except for thesis, professional project, and internship courses, no student will be permitted to take a course on a Pass-Fail or Satisfactory-Unsatisfactory grade basis without prior approval of the Director of Graduate Studies.

Examination

The candidate for the master's degree will pass an oral examination on the thesis or professional project. In addition, the thesis or professional project will be evaluated as a test of the candidate's writing skill.

The kinds of courses taken in the M.S.J. program largely depend on each student's background and interests. The program is intended to accommodate students of differing academic and professional backgrounds and interests.

A student typically will take all outside courses in one area (e.g., biology, political science, history), although the student may decide after consultation with the advisor to take courses in two or more outside areas. Courses outside the School of Journalism are selected by students in consultation with their advisors; outside courses selected are subject to the availability of space and prerequisite requirements in the offering departments.

Thesis/Professional Project

Each student must complete a thesis or professional project involving original work in the student's area of interest. The student should have a thesis or professional project proposal written by the end of the semester in which the first 12 hours of course work are completed.

Each student is responsible for developing ideas for the thesis or project. Through consultations with members of the journalism faculty, the student determines faculty interests and areas of expertise, and ideas are refined to the point where the student has a significant and feasible idea in mind.

Advisory Committee

The student, with approval of the Graduate Studies Committee, selects the journalism faculty member who would be best able to chair the advisory committee, subject to the agreement of the faculty member. If questions arise about a faculty member's interest or knowledge, the student directly asks the faculty member or consults the academic advisor or other members of the Graduate Studies Committee. With the chairperson, the student further refines the idea to a "preliminary proposal" stage, in which ideas and appropriate methodology are on paper, but not necessarily in formal proposal form.

After the student has written a preliminary proposal and selected a faculty chairperson, the student should select other members of the advisory committee, subject to their willingness to serve. The advisory committee must consist of not fewer than four members, one from outside the School of Journalism; two persons must be members of the WVU graduate faculty.

Proposal

At this point, students in the professional track must submit their proposals to the Graduate Studies Committee, which must approve all professional project topics (but not research methods, specific research questions, or hypotheses, etc.). Students may attend the meetings at which their proposals are discussed. After securing Graduate Studies Committee approval, students in the professional track schedule hearings with their guidance committees. Hearings with the guidance committees are required of all students (including those in the teaching research track).

Working under the guidance of the advisory committee, the student prepares a complete thesis or project proposal, extended from the preliminary proposal. Guidance for preparing a proposal is available from the director of graduate studies.

The student then has a consultative meeting, during which final revisions of and refinements in the proposal are discussed with the members of the advisory committee. Notices of the public meeting (to which students are invited) must be placed in the boxes of all members of the School of Journalism faculty and posted outside the dean's office at least two weeks before the meeting. One copy of the thesis or project proposal must be placed on reserve in the journalism reading room.

Thesis Approval

After the consultation, the committee votes to accept or reject the proposal. The student whose proposal is approved works closely with the committee in the completion of the thesis or project. All committee members should be kept informed and consulted for advice (as needed and as desired by them) as the thesis or project develops.

After each member of the advisory committee is satisfied with the work, a public oral examination is scheduled. Two weeks' notice must be given to all faculty of the School of Journalism (notices should be placed in all faculty boxes and posted outside the dean's office). One copy of the final thesis or project must be placed on reserve in the journalism reading room. Students also should make certain their shuttle sheets are filed with the Director of Graduate Studies in Journalism two weeks before the date of the oral defense.

Only committee members may vote on acceptance or rejection of a thesis. A majority vote is sufficient to approve the thesis, although a dissenting vote may be recorded. Furthermore, at least three signatures (two of which must be signatures of graduate faculty members) must be on the approval sheet. If one committee member is outvoted and feels he/she cannot sign the approval sheet, he/she may resign from the committee. Such action may force a reconstitution of the committee and repetition of earlier mentioned steps leading to the oral examination.

The chairperson of the advisory committee will decide whether final corrections (after the oral examination) have been made properly, and he/she will check the style and form of the final typed version. The MLA Stylesheet or other approved stylebook should be carefully followed during preparation of a thesis or professional project. Four copies of the final thesis or two copies of a project should be delivered to the School of Journalism.

Maintenance of Scholarship

All students are expected to maintain satisfactory progress toward the degree. A student's graduate record begins with the first course credited to the degree and includes all subsequent courses. All students must maintain a grade-point average of at least 3.0 and complete all requirements within four years. Students who fail to meet this standard will be dropped from the program.

Each student working toward the M.S.J. degree must register for at least one semester hour each regular (fall and spring) semester. This enrollment may be in course work or in Journalism 497 *Research*.

International Students

Believing that mutual benefit is derived when students from other countries study in the WVU School of Journalism, the School welcomes international students. At the same time, the School recognizes that journalism, more than many other fields, requires language skill. To profit by journalism study, international students must have a ready understanding of English. They will be called on to follow rapid speech in interviews, press conferences, public addresses, and in the classroom, as well as to deal with abstract ideas communicated in English. Award of the master's degree in journalism attests to the student's facility in English. International students must maintain the same 3.0 grade-point average required of other students.

Recognizing the language difficulty, the School of Journalism offers international students a transition semester. Unless students obviously are fluent in English and pass a test in which they demonstrate comprehensive knowledge of English fundamentals (grammar, punctuation, syntax, spelling), they will be offered a semester of undergraduate study (not for graduate credit), which will enable them to sharpen language skills. Such a transitional semester also will permit international students to study other selected courses in preparation for graduate study. These courses will help them adapt to the American system of journalism and to the new cultural environment.

Advertising (ADV)

201. *Retail Advertising*. I, II. 3 HR. PR: ADV 115 and ADV 203. Strategic planning for retail advertising; writing goal-oriented ads; management and sales of local advertising time or space; newspaper, radio, TV, direct marketing, outdoor advertising, specialty advertising.

203. *Advertising Media Analysis*. I, II. 3 HR. PR: ADV 113 and Conc: ADV 115. Survey of local and national media; identification of appropriate audiences and use of media resources; media space and time buying based on advertisers' strategic plans; introduction to computer-aided planning.

210. *Graphic Design*. II. 3 HR. PR: ADV 113. Design layouts for print media. Includes buying, supervising, and scheduling of art, typography, and print material. (2 HR. lec, 2 HR. lab)

239. *Seminar in Advertising Management Problems*. I, II. 2 HR. PR: Senior standing and major or minor in advertising. Application of the study of advertising research, law, and theory in the preparation of a national advertising campaign. Aspects of the campaign to cover marketing, research, creative, media, sales promotion, and presentation.

251. *Direct Marketing*. II. 3 HR. PR: ADV 115 and ADV 203. Mailing, marketing, and creation of direct-mail letters, brochures, involvement pieces, and reply cards; postal regulations, direct-mail law, and printing procedures.

259. *Campaigns*. I, II. 3 HR. PR: ADV 115 and ADV 203 and JRL 221 and Senior standing. Complete campaigns for simulated local stores and national businesses; evaluations based on professionalism of all facets of the campaign.

Broadcast News (BN)

287. *Broadcast Journalism 2*. I, II. 3 HR. PR: BN 185 and BN 186. Continuation of BN 186. Television news, including electronic news gathering (ENG) and production of newscasts. (Lab fees will be assessed for this course.)

317. *Contemporary Issues in Broadcast News*. II. 3 HR. Open to graduate journalism students and to journalism seniors with a 3.0 grade point average, consent. In-depth study of contemporary issues in broadcast journalism; role of television news in society, fairness and objectivity in news presentation, economic and organizational influences, criticism of television news formats. Individual papers on selected topics.

391. *Advanced Topics*. 1-6 HR.

392. *Research*. 1-15 HR.

490. *Teaching Practicum*. 1-3 HR.

491. *Advanced Study*. 1-6 HR.

492. *Directed Study*. 1-6 HR.

493. *Special Topics*. 1-6 HR.

494. *Special Seminars*. 1-6 HR.

495. *Independent Study*. 1-6 HR.

496. *Graduate Seminar*. 1 HR.

497. *Research*. 1-15 HR.

498. *Thesis*. 2-4 HR.

499. *Graduate Colloquium*. 1-6 HR.

Journalism (JRL)

221. *Mass Communications Research Methods*. I, II. 3 HR. A broad study of scientific and critical research methods as they apply to mass media practices; review of relevant sources for historical data gathering, readership and audience analysis; evaluation of marketing and public opinion research. (2 HR. lec., 1 HR. field experience.)

231. *Multi-Media Production*. 3 HR. PR: JRL 120. Preparation of two multi-media presentations; participation in a client-oriented project; color theory, slides, scriptwriting, research, and other aspects of visual communications. Supplies cost about \$75.00. (Lab fees will be assessed for this course.)

241. *Internship*. 3 HR. PR: Journalism majors only and foundation courses in one of the sequences. Full-time employment for a minimum of 10 weeks under a signed contract detailing the terms of the experience. (Graded pass/fail.)

242. *Practicum*. I, II, S. 1-2 HR. Journalism majors only. PR: Foundation courses in one of the sequences. Student must have a signed contract detailing terms of the learning experience. 8-20 hours per week for a minimum of 10 weeks, while taking other courses. (Graded on a Pass/Fail basis.)

300. *Introduction to Graduate Studies*. I. (No credit). (Required of all graduate journalism students.) Designed to orient students to graduate study. (Class meets once a week.)

304. *Mass Media and Society*. II. 3 HR. (Required of all graduate journalism students.) Study of mass media and their role in and influence on society; includes analysis of the social, political, and economic determinants of media content and character.

320. *Advanced Journalistic Writing and Research*. I, S. 3 HR. (Required of all graduate journalism students.) Study of advanced journalistic writing and research techniques. Students will practice the writing and research techniques on topics of their own choosing. Academic or popular topics may be selected.

339. *Seminar Adv Adv Manag Pr*. 3 HR.

340. *Corporate Communications*. I. 3 HR. Conferences to examine the synergistic effects of advertising, journalism, and public relations for different kinds of corporations. Team projects and presentations.

341. *Special Topics*. I, II, S. 1-6 HR. Student proposes idea for substantial reading, research, writing in area of interest; requirements may include conventional term paper, series of articles, slide presentations, etc. Student works independently of class-room setting.

380. *Thesis*. I, II, S. 2-6 HR. PR: Approved thesis proposal.

389. *Ethics of Mass Communications*. I. 2. PR: Open to graduate journalism students and journalism seniors with a 3.0 grade-point average; consent. Introduction to ethical principles and their application in the development of mass media systems and societal changes; professional codes; case studies; current problems.

390. *Professional Project*. I, II, S. 2-6 HR. PR: Approved professional project proposal. Non-thesis professional project for students preparing for some field in mass communication.

391. *Advanced Topics*. 1-6 HR.

397. *Research*. 1-15 HR.

401. *Research Methods*. I. 3 HR. (Required of all graduate journalism students.) Study of quantitative methods common to research in communications. An introduction to sampling, measurement, analytic procedures, and data.

402. *Seminar in Research Problems*. II. 3 HR. Advanced study of methodological techniques. Research project chosen from area of student's major interest. A written report of the study undertaken is required.

490. *Teaching Practicum*. 1-3 HR.
491. *Advanced Study*. 1-6 HR.
492. *Directed Study*. 1-6 HR.
493. *Special Topics*. 1-6 HR.
494. *Special Seminars*. 1-6 HR.
495. *Independent Study*. 1-6 HR.
496. *Graduate Seminar*. 1 HR.
497. *Research*. I, II, S. 1-15 HR. For graduate students not seeking course work credit but who wish to meet residence requirements, use the University's facilities, and participate in its academic and cultural programs.
498. *Thesis*. 2-4 HR.
499. *Graduate Colloquium*. 1-6 HR.

News-Editorial (N-E)

220. *Writing for Magazines*. I, II. 3 HR. PR: JRL 18. Professional approach; magazine analysis, query letters; writing, rewriting; submitting manuscripts for publication.
225. *High School Publications Advising*. II. 3 HR. PR: JRL 19 and ADV 113. (For students seeking Journalism certification.) Emphasizes writing styles, newspaper/ yearbook layout, rights and responsibilities of the teacher, students, and school system. Enrollees will construct instructional portfolios based on research and classroom discussion concepts. (Offered alternate years.)
227. *History of Journalism*. I. 3 HR. PR: JRL 1 and HIST 52 and HIST 53. Development of media from seventeenth-century England and the American colonies; great names in journalism; freedom of the press and its implications for and impact on the nation.
228. *Law of the News Media*. II. 3 HR. (For Journalism seniors and graduate students.) PR: Foundation courses for other sequences. The Law as it affects the mass media. Considered are such areas as libel, privacy, public records, criminal pre-trial publicity, freedom of information, obscenity.
230. *Editorial and Critical Writing*. I. 3 HR. PR: JRL 19 or PR 119. The student will analyze and write commentaries; study typical editorial pages and the ethics governing editorial page content; become familiar with libel, privacy, contempt, and other problems—operating and political—as they arise.
391. *Advanced Topics*. 1-6 HR.
397. *Research*. 1-15 HR.
490. *Teaching Practicum*. 1-3 HR.
491. *Advanced Study*. 1-6 HR.
492. *Directed Study*. 1-6 HR.
493. *Special Topics*. 1-6 HR.
494. *Special Seminars*. 1-6 HR.
495. *Independent Study*. 1-6 HR.
496. *Graduate Seminar*. 1 HR.
497. *Research*. 1-15 HR.

498. *Thesis*. 2-4 HR.

499. *Graduate Colloquium*. 1-6 HR.

Public Relations (PR)

222. *Public Relations Case Studies*. II. 3 HR. PR: PR 124 and JRL 221 or consent. Seminar based on in-depth studies of public relations programs developed and applied in support of our institutions. Primary emphasis on successful campaigns, but unsuccessful efforts also will be examined for causes of failure.

312. *Fund Raising and Foundation Management*. I. 3 HR. PR: Journalism graduate student or senior standing. Seminar. Studies in fund raising, alumni relations, and foundation management.

391. *Advanced Topics*. 1-6 HR.

397. *Research*. 1-15 HR.

School of Medicine

Robert M. D'Alessandri, M.D., Dean and Vice President for Health Sciences
George A. Hedge, Ph.D., Associate Dean, Research and Graduate Studies
John W. Traubert, M.D., Associate Dean, Student and Curricular Affairs
James Shumway, Ph.D., Assistant Dean, Educational Programs

The West Virginia University School of Medicine shares excellent facilities in the Health Sciences Center with the other health-related professional schools of the University. The Ruby Memorial Hospital offers sophisticated medical technology, including magnetic resonance imagery, lithotripsy, laser surgery, and the necessary support technology. The Chestnut Ridge Psychiatric Hospital, the Mary Babb Randolph Regional Cancer Center, the Positron Emission Tomography, and the Mountainview Rehabilitation Hospital provide facilities totally dedicated to diagnosis, treatment, and research in their fields of specialization. Laboratories and teaching areas allow scientists to work toward their goals. Research areas of anatomy, biochemistry, cellular biology, medical technology, microbiology and immunology, pathology, pharmacology and toxicology, and physiology support study toward masters of science and doctors of philosophy degrees.

A combined M.D.-Ph.D. program is available to those students who show exceptional interest and scholarly promise. All of the admission requirements of the School of Medicine and the specific graduate program apply. Students may apply for the combined degree program after concurrently with medical school application or acceptance to the School of Medicine.

All basic science graduate programs require the submission of scores from the Graduate Record Examination and some may require scores from the applicable advanced test, but in no program are test scores the sole criterion for admission. Prospective graduate students are urged to initiate application for admission as early as possible. The first step is an inquiry to the department offering the program desired; the reply to such an inquiry will include instructions for applying to the particular program.

Initial application must be made for admission to graduate study on standard forms provided by the WVU Office of Admissions and Records. To transfer from one University school or department to another, students may initiate a transfer request by contacting the Health Sciences Center Graduate Programs Office or their advisors. The advisor must contact the Health Sciences Center Graduate Programs Office to complete transfer.

The West Virginia University School of Medicine is accredited by the Liaison Committee on Medical Education of the American Medical Association and the Association of American Medical Colleges.

Graduate Programs

Anatomy	M.S., Ph.D.
Biochemistry (Medical)	M.S., Ph.D.
Community Health Promotion	M.S.
Exercise Physiology	M.S.
Medical Technology	M.S.
Microbiology and Immunology (Medical)	M.S., Ph.D.
Occupational Therapy	M.O.T.
Pharmacology and Toxicology	M.S., Ph.D.
Physical Therapy	M.P.T.
Physiology (Medical)	M.S., Ph.D.
Public Health	M.P.H.

Graduate Faculty

† Indicates regular membership in the graduate faculty.

* Indicates associate membership in the graduate faculty.

Anatomy

Professors

*William A. Beresford, D. Phil. (U. Oxford). Cell differentiation.

†J. David Blaha, M.D. (U. Mich.). Orthopedics and tissue reactions to implants.

†Eugene V. Cilento, Ph.D. (U. Cincinnati). Research. Quantitative *in vivo* microscopic studies of hepatic microcirculatory transport phenomena.

†James L. Culberson, Ph.D. (Tulane U.). Comparative vertebrate neuroanatomy of mammalian somatosensory systems.

†Richard D. Dey, Ph.D. (Mich. St. U.). Distribution and function of neural mediators in the airways and their role in asthma, bronchitis, and occupationally related lung diseases.

†Rumy A. Hilloowala, Ph.D. (U. Ala.). History of medicine, Physical anthropology, Primatology (craniofacial structure).

†Gary Kirk, Ph.D. (Yale U.). X-ray microanalysis of blood cell development and drug metabolism.

†Gregory W. Konat, Ph.D. (U. Odense). Molecular biology of myelinogenesis in the central nervous system.

R. John C. Pearson, M.B. (Cambridge U., England), M.P.H. (Yale) Adjunct. Community Medicine. Occupational Medicine.

†Carlin A. Pinkstaff, Ph.D. (Emory U.). Histochemistry, especially comparative histology and histochemistry of salivary glands.

†Frank D. Reilly, Ph.D. (U. Cinn.). Neurohistochemical, biochemical, *in vivo*, and electron microscopic studies of mechanisms regulating hepatic or splenic blood flow and metabolism in conditions of health and disease.

†Randall W. Reyer, Ph.D. (Yale U.). *Emeritus*. Regeneration, Developmental biology.

†Richard Wiggins, Ph.D. (Duke U.). Chair person. Cell and molecular biology of demyelinating and developmental disorders of the brain, including the effects of cocaine and malnutrition.

Associate Professors

*Morton H. Friedman, Ph.D. (U. Tenn.). Preprofessional advising, Educational administration, Student affairs.

*Dennis O. Overman, Ph.D. (U. Mich.). Experimental teratology, especially abnormal craniofacial development, Organ culture.

*Robert S. Pope, Ph.D. (U. ND). Electron microscopic structural and cytochemical aspects of intra- and intercellular development of mammalian female gamete under *in vivo* and *in vitro* conditions

†Adrienne Salm, Ph.D. (Mich. St. U.) Cell biology of astocytes.

†Elizabeth R. Walker, Ph.D. (WVU). Electron microscopy and immunocytochemistry of extracellular matrix components in connective tissue disease.

Assistant Professor

Ariel Agmon, Ph.D. (Stanford). Electrophysiology and morphology of developing cortex.

†Albert S. Berrebi, Ph.D. (U. Conn., Storrs). Neurobiology of hearing.

Biochemistry

Professors

†Diana S. Beattie, Ph.D. (U. Pitt.). Chairperson. Mitochondrial biogenesis, Mitochondrial metabolism, Heme biosynthesis, Interrelationship of heme and protein synthesis.

*Fred R. Butcher, Ph.D. (Ohio St. U.). Hormone action, Regulation of exocytosis, Calcium.

†William J. Canady, Ph.D. (Geo. Wash. U.). *Emeritus*. Enzyme kinetics.

†John P. Durham, Ph.D. (Ohio St. U.). Control of cell proliferation.

†Charles L. Harris, Ph.D. (U. Ill.). Structure and function of transfer RNA, RNA synthesis in mammalian cells.

†Michael R. Miller, Ph.D. (Penn. St. U.). Regulation of DNA metabolism, DNA replication, Repair in mammalian and fish cells.

†George P. Tryfiates, Ph.D. (Rutgers U.). *Emeritus*. Nutritional oncology.

†Mary J. Wimmer, Ph.D. (U. N.C.). Mechanisms and regulation of enzyme-catalyzed reactions.

Associate Professor

[†]Marilyn I. Evans, Ph.D. (U. Wash.). Hormonal regulation of genes.

Andrew K. Shiemke, Ph.D. (Oregon Grad. Inst.) Biological oxidation of methane and cyanide; Metalloproteins and bioinorganic chemistry.

Assistant Professors

[†]Brad Hillgartner, Ph.D. (Mich. St. U.). Nutritional control of gene expression, Thyroid hormone action.

Peter H. Mathers, Ph.D. (California Inst. of Technology). Molecular Biology of the developing eye.

[†]Vinay K. Pathak, Ph.D. (U.C.-Davis). Retroviral genetics, Isolation of antioncogenes.

[†]Lisa M. Salati, Ph.D. (U. Minn.). Regulation of gene expression by fatty acids.

Community Health Promotion

Professors

[†]Kenard McPherson, Ed.D. (Mich. St. U.). Program Director. Injury Control, Safety and mobility, Wellness.

^{*}Peter Shaffron, Ed.D. (WVU). Safety and health education, Driver and traffic safety education, Older driver performance.

Associate Professor

Irene A. Tessaro, R.N., DrP.H. (U. NC). Program Evaluation, Research, Women's Health.

Assistant Professor

^{*}Karen K. Douglas, Ph.D. (Texas Wom. U.). Health, Education, Wellness, Curriculum development, fitness, AIDS education.

William E. Peger, Ed.D. (WVU). Wellness, Holistic healing, Stress management, Health behavior.

Human Performance and Applied Exercise Science

Exercise Physiology

Professors

[†]Robert Hoeldtke, M.D., Ph.D. (Cornell, MIT). Autonomic neuropathy, Diabetes.

[†]Irma Ullrich, M.D. (U. Minn.). Diabetes and exercise, Obesity, Osteoporosis.

[†]Rachel Yeater, Ph.D. (WVU). Division Chair. Heart disease prevention, Cardiac rehabilitation.

Associate Professor

[†]W. Guyton Hornsby, Jr., Ph.D. (LSU). Diabetes and exercise, Strength and conditioning.

Assistant Professors

Daniel Bonner, M.S. (WVU). Exercise Physiology.

^{*}Randall Bryner, Ed.D. (WVU). Reproductive physiology, Exercise and immune function.

Paul Gordon, Ph.D. (Pitt). Epidemiology, Physical activity, Lipids.

Frank Perna, Ed.D. (Boston U.). Exercise psychology, Immune function.

Occupational Therapy

Associate Professors

James J. McPherson, OTR/L, Ph.D. (U. of Wisconsin).

Reginald J. Urbanowski, OTR/L, Msc (U. of Alberta).

Assistant Professors

Melanie Collier, OTR/L, B.S. (U. of Pennsylvania).

Anne F. Cronin, OTR/L, Ph.D. (U. of Florida, Webster U., U. of Missouri).

Randy P. McCombie, OTR/L, PhD (Loyola U. of Chicago).

Physical Therapy

Professors

MaryBeth Mandich, Ph.D. (WVU). Interim Chair, Pediatric and neuroscience physical therapy.

John J. Petronis, M.S. (WVU). Orthopedics physical therapy.

William Stauber, Ph.D. (Rutgers). Muscle physiology.

Assistant Professor

Nicholas Hawrylak, Ph.D. (U. Illinois). Anatomy and neuroscience.

Frances Huber, M.S. (U. Pittsburgh). Orthopedic physical therapy.

Corrie Mancinelli Ph.D. (WVU). Anatomy and orthopedic physical therapy.

Anne Swisher, M.S. (U. NC at Greensboro). Graduate and Distance Education Coordinator, cardiopulmonary physical therapy, exercise physiology.
 Carol Waggy, Ph.D. (WVU). Anatomy and hand physical therapy.
 Ralph Utzman, B.S. (WVU). Academic Coordinator of Clinical Education, Junior Level, basic principles of Physical Therapy, Organization/management.

Medical Technology

Professors

*Jean D. Holter, Ed.D. (WVU). Program Director. Medical technology, Chemistry, Instrumentation.
 *Nathaniel F. Rodman, M.D. (U. Penn). Pathology, Coagulation.
 †Donald A. Sens, Ph.D. (U. S. C.). Pathology.
 †Mary Ann Sens, M.D., Ph.D. (Med. U. of S.C.). Pathology.
 *John G. Thomas, Ph.D. (Syracuse U.). Pathology, Virology, Microbiology.

Associate Professors

†Singanallur N. Jagannathan, Ph.D. (U. Bombay). Pathology, Biochemistry.
 †Roger S. Riley, M.D., Ph.D. (WVU). Pathology, Hematology.
 *Harry L. Taylor, Jr., M.D. (Med. Coll. of Ga.). Pathology, Blood Banking.

Assistant Professor

*Steven M. Faynor, Ph.D. (U. Wisc.). Pathology, Toxicology, Clinical Chemistry.

Microbiology

Professors

†Stephen C. Aronoff, M.D. (U. Pitt.). Microbiology of cystic fibrosis, Infectious disease, Microbial resistance to antibiotics.
 †John B. Barnett, Ph.D. (U. Louisville). Chairperson, Immunology, Mechanism of the effects of xenobiotics on the immune system.
 †Robert Burrell, Ph.D. (Ohio St. U.). Immunology, Mechanisms of immune injury in pulmonary diseases.
 †Nyles Charon, Ph.D. (U. Minn.). Medical bacteriology, Genetics and physiology of spirochetes.
 Thomas Elliott, Ph.D. (UCSD). Bacterial gene expression.
 *John Hall, Ph.D. (Purdue U.). *Emeritus*. Parasitology, Bacterial endosymbionts of free-living amoebae.
 †Kenneth Landreth, Ph.D. (U. Wash.). Immunology, Developmental immunobiology, Lymphopoiesis.
 †Daniel M. Lewis, Ph.D. (WVU). Adjunct. Immunology, Mechanism of immunological reactions in the lung.
 *Stephen A. Olenchok, Ph.D. (WVU). Adjunct. Immunology, Study of immunological reactions in occupational lung disease.
 †Robert S. Pore, Ph.D. (U. Calif.). Mycology, Pathobiology of *Prototheca sp.* and the mycoses, Biotechnology projects include microbial bioconcentration and biopolymer production.
 †Irvin S. Snyder, Ph.D. (U. Kans.). Medical bacteriology, Mechanisms of pathogenicity, Clinical microbiology.
 †William Sorenson, Ph.D. (U. Texas). Adjunct. Role of fungi in occupational lung disease.
 †Herbert A. Thompson, Ph.D. (U. Kans.). Medical bacteriology, Mechanisms of pathogenicity, Clinical microbiology.
 †David B. Yelton, Ph.D. (U. Mass.). Microbial genetics, Molecular genetics, Bacteriophage.

Associate Professors

†James M. Sheil, Ph.D. (U. Ky.). Immunology, Mechanism of cytotoxic T lymphocyte-mediated antigen recognition and effector function.
 David Weissman, M.D. (Nwstrn U.). Immunology, Pulmonary immune responses, Effect of airway disease and smoking on immune function of the lung.

Assistant Professors

†Christopher Cuff, Ph.D. (Temple). Mucosal immunity of the gastrointestinal tract.
 Douglas Drevets, M.D. (U. Kan.). Inflammation, Endothelial cell biology, Macrophage adhesion and function in infection.
 Meenal Elliott, Ph.D. (U. Alabama Birmingham). Regulation of lymphocyte development.
 Solveig G. Ericson, M.D., Ph.D. (Boston U.). Hemopoiesis, Phenotypic and functional maturation of myeloid cells, Bone marrow transplantation.

- *Daniel Flynn, Ph.D. (NC State). Tyrosine phosphorylation and signal transduction.
 Laura F. Gibson, Ph.D. (WVU). Cell and molecular biology. Developmental hematopoiesis, Bone marrow microenvironment, Stromal cell function in bone marrow.
 Rosana Schafer, Ph.D. (Temple). Immunology. Immune response to infection by intracellular pathogens.
 Wei-Shau Hu, Ph.D. (U. C. -Davis). Retrovirus recombination and replication, Mechanisms of oncogene transduction, Human gene therapy.
 William McCleary, Ph.D. (U.C. -Berkely). Mechanisms of signal transduction. Molecular genetics.

Pharmacology and Toxicology

Professors

- *Charles R. Craig, Ph.D. (U. Wisc.). Mechanism of action of anticonvulsant drugs, Experimental epilepsy, Neuropharmacology.
 *Mary E. Davis, Ph.D. (Mich. St. U.). Mechanisms of hepatic and renal toxicity.
 *Jeffrey S. Fedan, Ph.D. (U. Ala.). Adjunct. Photo affinity labeling of receptors, Mechanisms of airway hyperactivity.
 *William W. Fleming, Ph.D. (Princeton U.). Chairperson. Factors regulating the sensitivity of cells to drugs, Electrophysiology of cell membranes, Signal transduction.
 *Michael G. Mawhinney, Ph.D. (WVU). Connective-tissue metabolism in male sex accessory tissues, Endocrine pharmacology of prostatic cancer.
 *Mark J. Reasor, Ph.D. (J. Hopkins U.). Pulmonary toxicology of dusts, Drug-induced lipodosis, In vitro toxicology.
 *David J. Smith, Ph.D. (WVU). Alterations induced by analgesics and anesthetics in monoaminergic and opiate neuronal transmission, Pain reactions.
 *Robert E. Stitzel, Ph.D. (U. Minn.). Co-Chairperson. Mechanism of action of antihypertensive agents, Biochemical factors influencing vascular reactivity.
 *Jeannine S. Strobl, Ph.D. (Geo. Wash. U.). Treatment of breast cancer. Molecular pharmacology of growth hormone.
 *David A. Taylor, Ph.D. (WVU). Factors underlying cellular adaptation and its involvement in pathological conditions, Electrophysiology and signal transduction.
 *Knox Van Dyke, Ph.D. (St. Louis U.). Chemiluminescence in human cells, Effects of antiinflammatory drugs on chemiluminescence.
 *Kenneth Weber, Ph.D. (U. Minn.). Adjunct. Respiratory mechanics, Mechanisms of occupational respiratory disease.
 *William F. Wonderlin, Ph.D. (Johns Hopkins U.). Ion channel pharmacology, Physiological development of ion channels.

Associate Professors

- *Dale L. Birkle, Ph.D. (Va. Commonwealth U.). Membrane lipids and lipid-derived autacoids as regulators of neurotransmissions.

Assistant Professors

- Stephen G. Graber, Ph.D. (U. Vt.). Molecular mechanics of signal transduction, Specificity of G-protein action.
 *Elizabeth Anne Johnson, Ph.D. (U. Cal., S.F.). Adjunct. Tumor tissue biology, Cell cycle regulating proteins, Tumor tissue markers.

Research Assistant Professors

- Kons Jian-Qiang, M.D., Ph.D. (Sun Yat-sen U. of Med. Sciences). Electrophysiology of cell membranes, Signal transduction.

Physiology

Professors

- *Christine Baylis, Ph.D. (Leeds U.). Renal and systemic hemodynamics.
 *Paul B. Brown, Ph.D. (U. Chicago). Neurophysiology, Neuroanatomy.
 *Vincent Castranova, Ph.D. (WVU). Regulation of membrane transport.
 *Stanley Einzig, M.D. (UCLA), Ph.D. (U. of Minn). Cardiovascular physiology.
 *Robert L. Goodman, Ph.D. (U. Pitt.). Neuroendocrine control of ovarian function.

- *George A. Hedge, Ph.D. (Stanford U.). Acting Chairperson. Thyroid and adrenocortical neuroendocrinology.
- *Michael D. Johnson, Ph.D. (U. Mich.). Neural and hormonal control of renal function and blood pressure.
- *David Kreulen, Ph.D. (Wayne State U.). Neurotransmitter actions and function, Neuropharmacology of ion channels in neurons.
- *Ping Lee, Ph.D. (Duke U.). Membrane transport.
- *Philip R. Miles, Ph.D. (WVU). Cellular physiology of the lung.
- *David Z. Morgan, M.D. (Med. Coll. of Va.). Director, Geriatric Program. Advice for retired patients.
- *William T. Stauber, Ph.D. (Rutgers U.). Muscle adaptation/injury, Proteases, Lysosomes.

Associate Professors

- *Matthew Boegehold, Ph.D. (U. AZ.) Regulation of the microcirculation; Microvascular alterations in hypertension.
- †John M. Connors, Ph.D. (U. Ill.). Research. Feedback control of hypothalamic-pituitary-thyroid axis.
- *Gunter N. Franz, Ph.D. (U. Wash.). Voltage clamping of cell membranes and lung mechanics.
- *David G. Frazer, Ph.D. (Penn. St. U.). Examination of mechanical properties of excised lungs.
- *Wil E. Gladfelter, Ph.D. (U. Penn.). *Emeritus*. Hypothalamic control of the excitability of the motor system.
- *Ronald Millecchia, Ph.D. (Rockefeller U.). Neurophysiology.
- *George A. Spirou, Ph.D. (U. of Fla.). Neurophysiology. Neuroanatomy of audition.
- †Stanley Yokota, Ph.D. (U. Calif.-Riverside). Renal physiology, Microcirculation, Osmoregulation.

Assistant Professors

- *Linda J. Huffman, Ph.D. (U. Nebr.). Research. Neuroendocrinology, Thyroid axis.

Research Associate Professor

- *Mieczyslaw Michalkiewicz, D.V.M. (U. Warsaw). Research. Thyroid and pituitary neuroendocrinology.

Research Assistant Professor

- *Alberto Travagli, Ph.D. (Ferrara U. Georgetown). Electrophysiology of autonomic nervous system.

Public Health

Professors

- Bill Carlton, Ed.D., M.S. (U. Tenn.-Knoxville). Program Director.
- Alan Ducatman, M.D. (Wayne St. U), M.Sc. (City U. New York Hunter College and Mt. Sinai, School of Medicine, NY). Department Chair.
- John Pearson, M.B., M.A. (Cambridge U), M.P.H. (Yale U). Community Medicine
- David Hall, Ph.D. (U. Ky.). Chair, Committee on Admissions, School of Medicine. Community Medicine.
- Alvin H. Moss, M.D. (U. of Pennsylvania, Philadelphia, PA). Director, Center for Health Ethics and Law.

Assistant Professors

- John D. Meyer, M.D. (Cornell U. Medical College, NY), M.P.H., M.A. (Boston U. School of Public Health). Associate Director, Occupational Medicine Residency Program, Institute of Occupational and Environmental Health
- Elizabeth Barnett, Ph.D., M.P.H. (UNC). Prevention Research Center Syed Islam, Dr.P.H. (U. Michigan), M.B.B.S. (Medical College of Bangladesh), M.P.H. (U. Alabama Birmingham & U. of Sydney, Australia). Institute of Occupational and Environmental Health
- Debra Krummel, Ph.D. (Penn St. U), M.S. (Case Western Reserve U). Prevention Research Center.
- Geri Dino, Ph.D., M.S. (Kansas St. U). Prevention Research Center.
- Sandra Magnetti, Dr.P.H. (U. Texas Health Science Center-Houston), M.S. (U. of California Davis/Berkeley). Institute of Occupational and Environmental Health.
- Carles Muntaner, Ph.D., M.D. (U. of Barcelona -Spain). Institute of Occupational and Environmental Health and Prevention Research Center.

Associate Professors

Edward J. Doyle, Jr., M.D. (The George Washington University School of Medicine), M.Sc. (U. of Southern California). Clinical Director, Institute of Occupational and Environmental Health
Kenneth Simon, Ed.D., M.S. (Columbia U). Director, Prevention Research Center.
Gerry Hobbs, Ph.D., M.S. (Kansas St. U.). Statistics.
William D. Wyant, M.S.E, M.P.A. (WVU). Department Associate Chair Lamont D. Nottingham, Ed.D. (Center for Study of Higher Education, School of Education, U. of Virginia, Charlottesville VA), M.P.H. (UNC). Community Medicine.
Renate E. Pore, Ph.D. (WVU), M.P.H. (UNC), M.A. (Oklahoma U., Norman, OK). Community Medicine.
Jacqueline J. Glover, Ph.D. (Georgetown U. & the Kennedy Institute of Ethics in Washington, DC). Center for Ethics and Law.

Instructors

Norma K. Bowyer, M.P.H. (Loma Linda U., CA), M.S. (WVU), M.P.A. (U. S. Dakota), O.D. (Southern College of Optometry Memphis, TN). Community Medicine.
Priscah Mujuru-Simoyi, M.P.H. (Boston U., Massachusetts), SCM (Thanate and Kent and Canterbury School of Midwifery England), SRN (Wycombe and Amersham School of Nursing England). Institute of Occupational and Environmental Health.

Anatomy

Richard C. Wiggins, Chairperson of the Department
Richard Dey, Graduate Program Coordinator
4052 Health Sciences North

Degrees Offered: Master of Science, Doctor of Philosophy

General Description

The Department of Anatomy graduate program is committed to training competent researchers and teachers. Successful completion of degree requirements is based on research and scholarly achievement. Students will have opportunities to experience and acquire the skills needed for successful careers in biomedical sciences, including critical thinking, problem solving, and leadership. Research experiences include evaluating scientific literature, identifying critical scientific issues, experimental design, grant and manuscript writing, publication of scientific papers, and presentations at National meetings. Students with career interests in teaching will have the opportunity to gain experience in innovative teaching methods and techniques, including problem-based learning, computer-assisted learning, and integrated teaching approaches. The program emphasizes various aspects of biomedical sciences, including structural, cellular, molecular and developmental biology. After completion of core courses, students conduct an original research project culminating in a dissertation (Ph.D.) or a thesis (M.S.).

Admission

In addition to the admission procedure of the University, the Department of Anatomy requires that each applicant complete a departmental application form obtained from the department. After an application is favorably reviewed, applicants are invited for a personal interview whenever feasible. The applicant is admitted by the decision of the chair, the program director, and the admissions officer in consultation with the departmental graduate faculty.

Prerequisites

Candidates must hold a Bachelor or Master degree. A strong background in biological sciences, inorganic and organic chemistry, physics, and mathematics is required. Under special circumstances, some course requirements may be fulfilled after admission to the program. A grade-point average above 3.0 is necessary. The aptitude portion and an advanced section of the graduate record examination are generally required.

Research

Interdisciplinary research projects in the department include: Structure and transcriptional mechanisms controlling neural gene expression; Molecular biology and molecular genetics of neural degeneration and regeneration in the central nervous system; Developmental neurochemistry and environmental influences on brain development, especially nutrition; Neuroanatomy and neurophysiology of somatosensory and auditory systems; Structural plasticity of astrocytes and modulation of synaptic contacts in the central nervous system; Development of synaptic connections in the neocortex; Developmental genetics of behavioral rodent mutants; Neural basis of pulmonary diseases, especially asthma and occupational/environmental diseases; Mechanisms regulating microcirculation under pathophysiological conditions; Quantitative X-ray imaging of labeled molecules in differentiating cells and tissues by analytical electron microscopy; Orthopedic research on ligament healing and mathematically modeled joint motion; History of Anatomy; Postnatal craniofacial development.

Course Requirements

The first two years of the study consists of course work and introduction to research in one or more departmental laboratories. Completion of the two semester interdepartmental course in Molecular and Cellular Biochemistry and one course in either gross anatomy, neurobiology or microscopic anatomy and an approved course in biostatistics is required. The selection of 10 credits in other courses in basic biomedical sciences (such as advanced molecular biology, advanced biochemistry, anatomy, neurobiology, pathology, immunology, virology, physiology, pharmacology, biostatistics, etc.) is required and allows substantial flexibility to tailor the individual student's interests and research needs. The student, in consultation with a major advisor and an advisory committee, selects additional electives. Students must maintain a minimum 3.0 overall grade-point average.

Seminars and Journal Clubs

Students develop skills in formal presentation, critical thinking and scientific analysis by participating in departmental seminars and journal clubs.

Candidacy

To be admitted to candidacy for the Ph.D. degree, the student must pass a preliminary examination. In addition, a plan for the research project to be undertaken for the dissertation must be presented to the candidate's advisory committee and approved.

Dissertation

To be recommended for the Ph.D. degree, each student must satisfactorily complete a dissertation based on original research and defend the dissertation at an oral examination. Success in the dissertation research is the core of the degree.

Master of Science

The master's program in anatomy is offered primarily for students in certain specialized fields, such as physical therapy or in a conjoint program in dentistry or medicine. Its purpose is to arouse curiosity in and provide direct experience of scientific investigation in anatomy. It is not necessary for the student to complete the M.S. degree in order to qualify for admission into the Ph.D. program, although the student may elect to complete the requirements for this degree in progress toward the Ph.D.

An applicant who shows a special need for the M.S. degree must generally be as well qualified as applicants to the doctoral program. The M.S. student must complete courses in gross anatomy and microanatomy and six to nine hours of required and elective courses. A 2.75 grade-point average must be maintained. In addition to course work, the student must complete a thesis based on original research and defend the thesis at an oral comprehensive examination.

Anatomy (ANAT)

303. *Conceptual & Applied Gross Anatomy*. I. 10 HR. PR: Medical student standing or consent of chairperson. Gross anatomical study of the human body emphasizing conceptual, developmental, and clinically-related topics.

305. *Microanatomy*. (For medical students and a limited number of regular full-time graduate students in the medical basic sciences.) II. 5 HR. PR: Medical student standing or consent of chairperson. Cells, tissues, and organs.

308. *Neuroanatomy*. (For students in physical therapy and a limited number of regular full-time graduate students in other health sciences.) II. 2 HR. PR: Consent of instructor or chairperson. Gross and microscopic structure of the central nervous system.

309. *Microanatomy and Organology*. (For dental students and a limited number of regular full-time graduate students in the basic sciences.) I. 5 HR. PR: Dental student standing or consent of chairperson. Cells, tissues, and organs.

312. *Special Topics in Anatomy*. I, II. 2-4 HR. per sem. PR: Consent of chairperson or instructor. Different topics of current interest in anatomy that are not included in the regular graduate courses.

314. *Applied Anatomy*. I, II. 2-6 HR. per sem. PR: Consent of instructor or chairperson. Detailed study of anatomy adapted to the needs of the individual student.

316. *Craniofacial Growth and Maturation*. I. 1 HR. PR: Consent of instructor. The current concepts of craniofacial growth and maturation are presented and integrated for application to clinical problems.

318. *Oral Histology and Embryology*. (For dental students and a limited number of regular full-time graduate students in the medical basic sciences.) II. 2 HR. PR: Dental student standing or consent of instructor or chairperson. Structure, function, and development of oral tissues.

319. *Advanced Head and Neck Anatomy*. 1 HR. PR: Dental, medical, or graduate student in basic sciences, or consent. Head and neck craniofacial anatomy as it applies to specialties in dental or medical practice.

320. *Electron Microscopy*. II. 4 HR. PR: Consent. (For graduate students, upperclass students in the sciences, medical students.) Interdisciplinary. Introduction to cell fine structure and function. Preparation of biological specimens for electron microscopy.

324. *Human Gross Anatomy*. (For dental students and a limited number of regular, full-time graduate students in medical basic sciences.) 7 HR. PR: Dental student standing or consent of chairperson. Human anatomy including cadaver dissection for dental students. 4 HR. lec., 3 HR. lab.

391. *Advanced Topics*. 1-6 HR.

397. *Research*. I, II, S. PR: Consent of instructor or chairperson. (May be repeated as needed with permission). 1-15 HR.

401. *Advanced Gross Anatomy*. I, II. 2-6 HR. per sem. PR: ANAT 303 or 324 and consent of instructor or chairperson. Morphological and functional analysis of a selected region, with dissection.
402. *Advanced Developmental Anatomy*. II. 2-6 HR. per sem. PR: ANAT 303 or 324 and consent of instructor or chairperson. Detailed developmental anatomy of the fetal period and infancy. With dissections and analysis of variations and malformations.
403. *Seminar*. I, II. 1-6 HR. (1 HR. per sem.) (Course may be repeated.) PR: Consent of Graduate Committee. Special topics of historical interest.
405. *Experimental Embryology*. II. (Alternate years.) 3 HR. PR: Embryology and cellular physiology and biochemistry and consent of instructor or chairperson. Development, differentiation, and regeneration.
406. *Advanced Neuroanatomy*. I. 2-4 HR. per sem. (Course may be repeated.) PR: CCMD 375 and consent of instructor or chairperson. Detailed study of selected areas of the nervous system.
408. *Histochemistry*. II. (odd numbered years.) 3 HR. PR: ANAT 305 or 309, biochemistry, and consent of instructor or chairperson. Histochemical theory and techniques.
451. *Advanced Microanatomy and Organology*. I, II, or S. 2-4 HR. PR: ANAT 305 or 309, or BIOL 263 and consent of instructor or chairperson. An extension of the major topics included in ANAT 305 or 309. Special emphasis on recent contributions.
490. *Teaching Practicum*. I and II. 1-3 HR. PR: Consent of chairperson. Supervised practice in college teaching of anatomy. Graded as S or U.
491. *Advanced Anatomy*. I, II. 1-6 HR. PR: Consent of chair person.
492. *Directed Study*. I, II, S. 1-6 HR. Directed study, readings, and research.
493. *Special Topics*. I, II, S. 1-6 HR. A study of contemporary topics selected from recent developments in the field.
494. *Special Seminars*. I, II, S. 1-6 HR. Special seminars arranged for advanced graduate students, arranged for advanced graduate students, arranged for advanced graduate students.
495. *Independent Study*. I, II, S. 1-6 HR. Faculty supervised study of topics not available through regular course offerings.
496. *Graduate Seminar*. 1 HR. PR: Consent. It is anticipated that each graduate student will present at least one seminar to the assembled faculty and graduate student body of his/her program. (Graded S/U.)
497. *Research*. I, II, S. 1-15 HR. PR: Consent of Graduate Committee. (May be repeated as needed with consent of Graduate Studies Committee.)
498. *Thesis*. 2-4 HR.
499. *Graduate Colloquium*. 1-6 HR.

Biochemistry

Diana S. Beattie, Chairperson of the Department

3123 Health Sciences North

Degrees Offered: Master of Science, Doctor of Philosophy

Graduate programs in the Department of Biochemistry are designed to assist students in the development of their own capabilities for independent thought and research. All students are provided with a strong biochemistry background; however, the program has sufficient flexibility to allow individual students to select advanced specialty courses in biochemistry which are of particular importance to their career goals. Faculty research problems are of current interest and are diverse, reflecting the broad spectrum of areas encompassing biochemistry.

Prerequisites

A prospective graduate student should hold a bachelor's degree with a science major and should have successfully completed courses in qualitative-quantitative chemical analysis, organic chemistry, calculus, physics, and physical chemistry. In some cases, a deficiency in the above may be made up after admission into the program.

Application Process

Application is made by submission of the following items to the Department of Biochemistry:

- The completed departmental application form (sent on request);
- Three letters of recommendation from professors who can evaluate the student's present abilities and potential;
- Official transcript of the applicant's college grades; and
- Official copy of Graduate Record Examination scores, preferably including an advanced subject test in chemistry, biology, or biochemistry, cell or molecular biology. Due to the sequence of courses, entrance in the fall is preferred. Application material and program details may be obtained by writing: The Graduate Coordinator, Department of Biochemistry, School of Medicine, West Virginia University, P.O. Box 9142, Morgantown, WV 26506-9142. The deadline for receipt of applications and supporting documents by the department is June 1; to be considered for financial support, applications should be submitted by February 1.

Course Work

To assure that all students become familiar with the basic principles of biochemistry, the first year of the doctor of philosophy (Ph.D.) program is devoted primarily to course work. In addition to formal courses during the first semester, students participate in a laboratory program which involves all faculty members. The laboratory experience is designed to introduce students to basic biochemistry research skills. During the second semester, students will undertake research in at least two laboratories of their choice.

Research Advisor

Upon successful completion of the first year, students will choose a dissertation research advisor, at which time emphasis will be placed on research. During the second year, specialized courses in biochemistry will be offered as the students continue their research programs. During subsequent years, the students emphasize independent dissertation research, and a few formal courses are taken.

An essential component of the Ph.D. program is participation in departmental journal clubs and seminars. Both students and faculty participate; thus, students learn to organize effectively and present research material to a large group of people.

Completion of the Ph.D. program is realized when the student successfully presents the research results to both the Department of Biochemistry and a graduate advisory committee. Typically, four years are required to realize this goal.

Master of Science

The Department of Biochemistry offers the thesis master's degree. This program involves completion of a master's research project in addition to formal course work. Two to three years are generally required to complete the M.S. program.

Research

Regulation of intermediary metabolism. Structure and function of nucleic acids. Chemistry of enzymes and serum proteins. Nutritional oncology. Secretory mechanisms. Biogenesis of membranes. Regulation of gene expression. RNA processing. Protein structure and function. Retroviral genetics.

Biochemistry (BIOC)

231. *General Biochemistry*. I. 4-7 HR. PR: General chemistry, organic chemistry. (For medical students; others by consent.) Consists of seven main lectures, one clinical correlation lecture and one problem session per week.

239. *Clinical Chemical Techniques*. II. 4 HR. PR: BIOC 139 and BIOC 231 or equiv. (Primarily for medical technology students; open to other qualified students by consent.)

305. *General Biochemistry*. II. 4 HR. PR: Inorganic chemistry, organic chemistry, and consent. (For dental and graduate students.) Lecture, conference, and demonstration.

391. *Advanced Topics*. I, II, S. Variable 1-6 HR. PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

397. *Research*. I, II, S. Variable. 1-15 HR. PR: Consent. Research activities leading to a thesis, problem report, research paper, or equivalent scholarly project.

399. *Special Topics*. A. I, II. 1-18 HR. PR: Consent. Journal Club, Teaching and Laboratory Rotations. B. I (4 HR.), II (3 HR.). PR: General chemistry, organic chemistry. For graduate students in basic sciences programs.

490. *Teaching Practicum*. I and II. 1-3 HR. Consent of chairperson. Supervised practice in college teaching of biochemistry. Graded as S or U.

491. *Advanced Study*. I, II. 1-6 HR. PR: Consent. Investigation in advanced subjects which are not covered in regularly scheduled courses. Study may be independent or through specially scheduled lectures.

492. *Directed Study*. 1-6 HR.

493. *Special Topics*. 1-6 HR.

494. *Special Seminars*. 1-6 HR.

495. *Independent Study*. 1-6 HR.

496. *Graduate Seminar*. I, II. 1 HR. PR: Consent. Presentation and discussion of special topics.

497. *Research*. I, II, S. 1-15 HR. PR: Consent.

498. *Thesis*. 2-4 HR.

499. *Graduate Colloquium*. 1-6 HR.

Center on Aging/Education Unit

The WVU Center on Aging, part of the Robert C. Byrd Health Sciences Center School of Medicine, reflects the University's commitment to increased understanding of the aging process and support efforts to improve the quality of life for elderly persons, particularly the rural elderly of Appalachia. The Center on Aging promotes and coordinates interdisciplinary teaching, research, clinical service, and community outreach service in aging at WVU through the activities of its constituent units.

The Education Unit of the Center on Aging offers a graduate certification program in multidisciplinary gerontology for graduate students pursuing advanced degrees in other fields and special graduate students who are non-degree candidates.

The certificate program requires a minimum of 15 graduate hours including *Fundamentals of Gerontology*, which is cross-listed as Biology 375 and Psychology 375, and nine elective hours selected on the basis of appropriateness to the individual student's goals from an approved pool of aging-related courses. All students will enroll for three hours in research and complete a required research project and paper that demonstrates linkage between gerontology and the student's primary discipline. This capstone paper will be presented at a gerontology research seminar coordinated by the education unit.

Candidates for the graduate certificate must meet regular WVU graduate admission requirements and must be able to demonstrate elementary knowledge of gerontology, i.e. material covered in MDS 50 *Introduction to Gerontology*. Program participants must maintain a minimum grade-point average of 3.0 in certificate course work.

Other University units involved in teaching and research in human aging include the College of Agriculture and Forestry, the Eberly College of Arts and Sciences, the College of Human Resources and Education, the School of Nursing, the School of Pharmacy, the School of Physical Education, the School of Social Work, and Extension Services.

The education unit's library collection augments the gerontology holdings of other campus libraries and is open to the entire community Monday through Friday, 8:30 a.m. - 5:00 p.m.

Further information, assistance in academic program planning in multidisciplinary gerontology, and registration forms may be obtained from the West Virginia University Center on Aging/Education Unit, Chestnut Ridge Professional Bldg, Suite 12, 918 Chestnut Ridge Road, P.O. Box 9127, Morgantown, WV 26506-9127. Telephone (304) 293-2081.

Gerontology (GERN)

291/391. *Special Topics*. I, II. 1-3 HR. PR: Consent. Special problems for undergraduate and graduate students working on certificate programs. Topics change from semester to semester. Students can enroll more than once.

Note: *The Aging Woman* is the topic for 291 section b and 391 section a.

Other Courses

Biology/Psychology 375. *Fundamentals of Gerontology*. II. 3 HR. PR: MDS 50 or consent. An advanced multidisciplinary examination of current research in biological, psychological, and sociological issues of human aging and the ways in which these impinge on the individual to create both problems and new opportunities. (Also listed as PSYC 375.)

382. *Special Topics*. I, II, S. 1-6 hr. PR: Advanced standing and consent. Independent study and directed readings in specialized areas of counseling and guidance. (Some sections of COUN 382 have prerequisite requirements. Check with the instructor.)

For a complete listing of aging-related courses including graduate certificate electives, contact the Center on Aging, Chestnut Ridge Professional Building, 918 Chestnut Ridge Road, P.O. Box 9127, Morgantown, WV 26506-9127. Telephone (304) 293-2081.

Community Health Promotion

Kenard McPherson, Program Director
167 Coliseum

Degree Offered: Master of Science

The Community Health Promotion Program offers a Master of Science degree with majors in community health education and school health education. The community health education degree includes a clinical or research option. The major purpose of the program is to prepare health professionals to interface between communities and health care systems. Community health professionals serve as partners in the health care team and provide leadership in planning, developing, organizing, implementing, and evaluating health promotion programs.

Health promotion graduates may be employed as classroom health educators, community health educators, wellness center program managers, and health promotion educators in corporations, health agencies, or state/county health departments.

Admission

Applicants in either degree program must hold a bachelor's degree from an accredited college or university, meet university admission standards, and demonstrate academic achievement in previous studies. Applicants for the school health education master's program must hold a West Virginia teaching certificate or be in the process of obtaining certification.

Grade-Point Average

Applicants must have attained a GPA of 3.00 or better at the bachelor's or master's level to be accepted as a regular graduate student. Applicants with a GPA below 3.00 may be accepted on a provisional basis. Applicants meeting admission requirements may not be accepted if the maximum enrollment level has been reached. Preferential admission is given to the best qualified students fulfilling one or more of the following qualifications:

- At least two years of full-time work experience in the health or human services field.
- Breadth and depth of academic preparation in the biological or health sciences.
- Bachelor's degree in health education or health promotion.

Application Deadline

Applicants are regularly admitted for the fall term. Preference is given to early applicants meeting all admission requirements by March 1 of the year in which the applicant intends to begin the master's program. Under unusual circumstances, applicants may be admitted during the spring or summer terms.

Community Health Education Course Work Requirements

Students in the community health education master's program must complete either a clinical or research emphasis. Students selecting the **clinical emphasis** complete 48 hours of study (36 hours of course work and a 12-hour practicum). Required courses are: CHPR 310, 311, 312, 314, 334, 335, 338, and 348. In addition to the 24 hours of required courses, students must take 12 hours of electives approved by the student's faculty committee. They may choose from local areas such as substance abuse, injury control, wellness, evaluation, and epidemiology. The practicum, CHPR 350, is designed for students without professional health promotion-related work experience. For students without work experience, 12 hours of CHPR 350 is required. For those with two

or more years of professional health promotion-related work experience, the work experience may be accepted in lieu of the practicum. Partial credit for CHPR 350 for students with less than two years of professional health promotion-related work experience may be determined by the student's faculty committee.

Students selecting the **research emphasis** must complete 36 credit hours. Required courses are: CHPR 310, 311, 312, 314, 334, 335, and 397 (six hours). In addition to 24 hours of required courses, students must take twelve hours of electives from health promotion, epidemiology, statistics, research, and scientific methods courses. Electives must be approved by the student's faculty committee.

A customized program may be designed for students with extraordinary professional experience or academic preparation. Such a program must be approved by the faculty committee and incorporated into the student's plan of study before completing any course work toward the community health promotion degree.

The school health education master's degree program is open *only* to students who hold a West Virginia teaching certificate or are eligible for certification. Students must complete 36 credit hours. Required courses are: CHPR 301, 307, 220 **or** 309, 310, 311, 312, 333, 334, 335, 338, 391 *Advanced Topics: Health Concepts*, and 391 *Advanced Topics: Performance Assessment*.

The graduate program in school health education is undergoing review at this time. For more up-to-date information, please contact the program director.

Community Health Promotion (CHPR)

220. *Drug and Alcohol Abuse Prevention*. 3 HR. Experiences designed to prevent the development of abusive drug-taking relationships by focusing on psychological variables such as self-esteem, coping skills and development of support networks.

231. *Safety in Motor Transportation Services*. 3 HR. PR: CHPR 131 or consent. (May not be taken for both undergraduate and graduate credit.) Safety elements of automotive transportation including design, operation, planning, control, and effects of legislation.

232. *Safety Education Principles and Content*. 3 HR. PR: CHPR 131 or consent. Study and analysis of content areas usually recommended for instructional programs within the field of safety, with emphasis on structured learning experiences.

255. *Traffic Safety Management*. 3 HR. PR: CHPR 151 or consent. (May not be taken for both undergraduate and graduate credit.) Elements of traffic safety management in public and private sectors are examined. Role of management organization, approaches, and programs is examined in light of the need for a safe, efficient highway transportation system.

256. *Driver and Safety Instructional Innovations*. 3 HR. PR: CHPR 151. (May not be taken for both undergraduate and graduate credit.) Innovations used in classroom and laboratory instruction applied to driver and safety education are studies (e.g., multimedia, multi-vehicle, in-vehicle, on-street, simulation). Specific aspects of instruction are based on current literature and research.

257. *Alcohol Safety Programs*. 3 HR. Topics include alcohol programming in schools, community, and the workplace. Approaches, programs, and materials are examined for use at the local level. Scientific reports are studied to determine the effectiveness of various approaches to the alcohol problem.

290. *Women and Health*. 3 HR. Examination of theories, myths, and practices surrounding women's physical and mental health from both historical and present-day perspectives. Exploration of specific health issues and controversies and the rise of the women's health movement.

291. *Special Topics*. 1-6 HR. PR: Consent. Consideration of persistent issues and changing problems in the health promotion field. Emphasis will be placed upon health promotion interests of participating class members.

301. *Advanced School Health*. 3 HR. PR: Graduate standing and consent. Analysis of problems in school health services, healthful school living, nature of health education, and scope of health instruction which confronts teachers and administrators.

307. *Community Health: Human Sexuality*. 3 HR. PR: Consent. Analysis of sex-related issues including parenting, sex education, sexual sanctions, pornography, sexual dysfunction, and sexual variance. Designed for teachers, health professionals, and interested lay people.

308. *Community Health: Death Education*. 3 HR. PR: Consent. Surveys death/dying from humanistic viewpoint. Examines philosophical, psychological, legal, and sociological aspects of death, grief, and mourning. Appropriate for teachers, health professionals, and others desiring understanding of death as a part of living.

309. *Community Health: Drug Education*. 3 HR. PR: Consent. Designed to help students learn appropriate components of a drug education program, gain an understanding of drug taking in this society, and acquire insights into dependent behaviors.

310. *Introduction to Health Promotion*. I. 3 HR. Identifies the elements of health promotion to assist students in identifying program goals and professional goals in Health Promotion.

311. *Community Health Promotion*. I. 3 HR. Addresses various aspects of community health promotion including theories of community health program models; educational, social, and environmental interventions; and demographic and epidemiological analyses.

312. *Health Behavior Analysis*. 3 HR. The focus of this course is on the role of individual behavior in attaining health. Integration of the concepts of health education and behavioral science to facilitate changes in health behavior is addressed.

314. *Injury Prevention and Control*. I. 3 HR. The injury control problem is examined as a public health concern. Strategies and programs for injury prevention are studies for implementation with target groups who are overrepresented within the injury problem.

320. *Roles and Functions of Health Educators*. 3 HR. PR: Graduate standing and consent. An investigation of the roles and functions of the health educator in a variety of community settings including hospitals, clinics, voluntary agencies, etc.

332. *Safety Education Principles and Content*. 3 HR. PR: Consent. Study and analysis of content areas usually recommended for instructional programs within the field of safety with emphasis on structured learning experiences.

333. *Foundations of Wellness*. I. 3 HR. Wellness is examined as a component of health promotion. A wellness lifestyle is fundamental to promoting a holistic wellness concept. Quality of life issues and programs are explored for a variety of audiences.

334. *Health Promotion Research and Statistics*. II. 3 HR. PR: CHPR 310, 311, 312 or consent. This course is designed to introduce students to the basic elements of conducting effective evaluation of health promotion programs.

335. *Management for Health Promotions Professions*. 3 HR. PR: CHPR 310, 311, and 312, or consent. This course provides health promotion students with the essential skills to be effective managers in the community health environment.

338. *Design of Health Promotion Programs*. I, II. 3 HR. PR: CHPR 310, 311, 312 or consent. This course is designed to convey theory and practice for developing health promotion programs. The course addresses design principles appropriate to a wide range of health promotion programs.

348. *Applied Health Promotion Programs*. I, II. 3 HR. PR: CHPR 338 or concurrent. Students will apply information from CHPR 338 and other foundation courses in designing a health promotion program for a health agency or enterprise. Students will defend their program before their faculty committee.

350. *Practicum*. 1-12 HR. PR: Majority of plan of study completed and consent. Students are assigned to a field placement based on prior health promotion work experience. Under the supervision of faculty, students assume major responsibility for a program with a community health promotion organization.

355. *Traffic Safety Management*. 3 HR. PR: Consent. Elements of traffic safety management in public and private sectors are examined. Role of management, organization, approaches, and programs is examined in light of the need for a safe and efficient highway transportation system.

357. *Alcohol Safety Programs*. 3 HR. Topics include alcohol programming in schools, community, and the workplace. Approaches, programs, and materials are examined for use at the local level. Scientific reports are studied to determine the effectiveness of various approaches to the alcohol problem.

373. *Professional Development*. 1-6 HR. PR: Consent. Specially designed experiences for those interested in advancing professional skills in a particular specialty.

391. *Advanced Topics*. 1-6 HR. PR: Consent.

397. *Master's Degree Thesis*. 1-15 HR. PR: Consent.

482. *Supervised Applied Health Education Project*. 1 HR. PR: Advanced graduate standing or consent. Doctoral students only. Plan and conduct a health education intervention in other than a classroom setting, i.e., a defined community.

483. *Supervised Health Education Research Report*. 1 HR. PR: Advanced graduate standing and consent. Doctoral students only. A written report of empirical research of either a survey or an experiment.

490. *Teaching Practicum*. 1-3 HR. PR: Consent. Supervised practice in college teaching of health-related learning experiences.

491. *Advanced Study*. 1-6 HR. PR: Consent. Investigation in advanced subjects which are not covered in regularly scheduled courses. Study may be independent or through specially scheduled lectures.

492. *Directed Study*. 1-6 HR.

493. *Special Topics*. 1-6 HR.

494. *Special Seminars*. 1-6 HR.

495. *Independent Study*. 1-6 HR.

496. *Graduate Seminar*. 1 HR.

497. *Research*. 1-15 HR. PR: Consent.

Department of Human Performance and Applied Exercise Science

Three divisions make up the Department of Human Performance and Applied Exercise Science. The divisions are:

Division of Exercise Physiology *bachelors, masters, and doctoral programs*

Division of Occupational Therapy *entry-level masters program*

Division of Physical Therapy *has an entry-level masters program*

The chairs of all three divisions make up an executive council to govern the department.

Division of Exercise Physiology

Rachel Yeater, Director of Exercise Physiology; Graduate Coordinator
131 Coliseum

Degrees Offered: Master of Science, Doctor of Education

(The doctor of education is temporarily administered by the School of Physical Education.)

The exercise physiology master of science program prepares students for careers in adult fitness, hospital- or corporate-based wellness programs, or cardiac rehabilitation. Students specialize by completing a 200 hour internship. A thesis option is also available.

Admission

Fifteen students are accepted once a year (by May 30) on a competitive basis. Applicants must have a baccalaureate degree in an allied field from an accredited institution with a minimum undergraduate grade-point average of 2.75 (based on A = 4.0 grade points). Three letters of reference are required. Applicants are selected for admission on the basis of scholastic standing (special attention is given to science grades), and recommendations. The graduate application, three letters of reference, and college transcripts must be submitted by March 15.

Required Courses

A minimum of 36 semester hours of credit is required for graduation. The following courses or course equivalents are required:

ATTR 219 <i>Gross Anatomy</i>	3 Hr.
PSIO 241 <i>Mechanisms of Body Function</i>	4 Hr.
PHAR 249 <i>Drugs and Medicines</i>	3 Hr.
HN&F 310 <i>Human Nutrition</i>	3 Hr.
SS 315 <i>Research Methodology in Physical Education</i>	3 Hr.
EXPH 367 <i>Theories of Sport Physiology</i>	3 Hr.
STAT 311 <i>Statistical Methods</i>	3 Hr.
EXPH 370 <i>Advanced Study (Laboratory Techniques)</i>	3 Hr.
EXPH 371 <i>Advanced Study (Stress Testing)</i>	3-6 Hr.
EXPH 368 <i>Advanced Study (Diabetes and Exercise)</i>	3 Hr.
EXPH 372 <i>Advanced Study (Internship)</i>	6 Hr.

OR

EXPH 397 <i>Research</i>	3 Hr.
EXPH 498 <i>Dissertation/Thesis Seminar</i>	3 Hr.

Doctor of Education

The major objectives of the doctoral program are to prepare professionals in exercise physiology who have (1) cognitive expertise in exercise physiology, (2) clinical skills in both preventive and rehabilitation medicine including assessment of functional capacity and exercise prescription, and (3) expertise in conducting applied and/or clinical research.

Admission

Students must have a master's degree with a minimum graduate grade-point average of 3.0, two letters of recommendation from professors involved with the student's graduate work, an official transcript of all college work, and the results of the Graduate Record Examination or the Miller Analogies Test. The minimum recommended score on the Graduate Record Examination is 1000 for the verbal and quantitative scores combined. The minimum recommended score on the Miller Analogies Test is 50. However, students will not be accepted nor denied acceptance based solely on test score. An interview with the program faculty is required. All students will be admitted provisionally pending completion of a minimum of 18 hours of course work with grades of B or higher and two semesters of clinical laboratory work. Clinical work will be evaluated by: (1) a subjective judgment by the program faculty concerning the student's ability to positively interact with patients and/or exercise program participants, and (2) demonstration of competency in clinical skills, which includes such things as stress testing, ECG interpretation, and exercise prescription for symptomatic and asymptomatic patients.

Graduate Committee

After the provisional year, students who are accepted as regular graduate students will work with a chairperson to form a graduate committee. The committee and student will develop a plan of study which will include required course work for the program and the method and areas for a comprehensive exam. If the student has not completed the following basic science requirements, they will be required as part of the doctoral program. If students do not have an M.S. in exercise physiology, they will be required to take the M.S.-level required courses.

Basic Science Requirements

- 8 hours biology (equivalent of WVU BIOL 1, 2, 3, 4)
- 8 hours physics (equivalent of WVU PHYS 1 and 2)
- 8 hours general chemistry (equivalent of WVU CHEM 15 and 16)
- 8 hours organic chemistry (equivalent of WVU CHEM 133 and 134)
- 3 hours calculus (equivalent of WVU MATH 128)

M.S.-Level Required Courses

- ATTR 219 *Gross Anatomy* 3 Hr.
- PSIO 241 *Mechanisms of Body Functions* 3 Hr.
- PHAR 249 *Drugs and Medicines* 3 Hr.
- EXPH 367 *Theories of Sport Physiology* 3 Hr.
- EXPH 370 *Laboratory Techniques/Methods* 3 Hr.
- EXPH 371 *Stress Testing* 3 Hr.

Required Doctoral Courses

*Graduate-level biochemistry courses	3 HR.
Medical Physiology 344	5 HR.
Medical Physiology 345	5 HR.
EXPH 491 <i>Advanced Study Exercise Physiology</i>	9 HR.
EXPH 491 <i>Advanced Study Clinical Internship</i>	3-12 HR.
EXPH 496 <i>Graduate Seminar</i>	12 HR.

*Statistics 9 HR.

*Specific courses to be determined by doctoral committee.

Seminar

The graduate seminar is required during all semesters of doctoral work; students present a research article each week during spring and fall semester for 3 hours of graduate credit. Students designate a minor area such as cardiac rehabilitation, reproductive physiology, or nutrition and take 12 to 15 hours of course work in this area. Students typically spend three to five years completing the program depending on whether they have a master's degree in exercise physiology before entering.

Comprehensive Examination/Dissertation

Following completion of the course work, the student will take a written comprehensive examination on the areas specified on the doctoral plan of study. If the student successfully passes the comprehensive exam, the student can orally defend to the graduate committee a prospectus for the dissertation. If the student fails the comprehensive exam the second time, the student is dismissed from the program.

The student must complete a dissertation that makes a contribution to knowledge in applied exercise physiology and pass an oral examination based primarily upon the dissertation. After successful completion of the oral examination and submission of the final copy of the dissertation, the candidate will be recommended for the degree.

Exercise Physiology (EXPH)

360. *Biomechanical Analysis of Sport and Physical Activity*. II, S. 3 HR. PR: EXPH 164 and EXPH 165 or equiv.; and SS 315. Advanced principles of body mechanics and analysis of muscle and joint actions in coordinated movement and neuromuscular physiology.

367. *Exercise Physiology 2*. II. 3 HR. PR: Consent. Thorough and workable knowledge of the functioning of body systems during exercise, the acute and chronic adaptations that occur, and the practical application of work physiology.

368. *Diabetes and Exercise*. II. 3 HR. PR: Graduate standing, Consent. In-depth study of topics related to the comprehensive management of patients with diabetes mellitus, with special emphasis on the use of exercise in diabetes care.

370. *Lab Techniques and Methods II*. I, S. 3 HR. PR: Graduate standing, Consent. This course teaches the techniques and methods used to monitor physiologic systems in humans during rest and exercise. It includes methods used to assess the health status of individuals desirous of exercise testing or prescription.

371. *Stress Testing*. II. 3 HR. PR: EXPH 370, consent. In-depth study of graded exercise testing in laboratory or field situations. The course includes protocols for athletes, asymptomatic individuals, and special populations.

372. *Professional Field Placement II*. I, II, S. 1-18 HR. PR: EXPH 370, and EXPH 371, Consent. Prearranged program to be planned, supervised, and evaluated for credit by faculty and field supervisors. Involves temporary placement with public or private enterprise for professional competence development. (Internship).

391. *Advanced Topics*. 1-6 HR. PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.
397. *Research*. 1-15 HR. PR: Consent. Research activities leading to a thesis, problem report, research paper, or equivalent scholarly project.
490. *Practicum*. I, II, S. 1-3 HR. PR: Consent. Supervised practice in teaching exercise physiology.
491. *Advanced Study*. I, II, S. 1-6 HR. PR: Consent. Investigation in advanced subjects which are not covered in regularly scheduled courses. Study may be independent or through specially scheduled lectures.
492. *Directed Study*. I, II, S. 1-6 HR. Directed study, reading, and/or research.
493. *Special Topics*. I, II, S. 1-6 HR. PR: Consent. A study of contemporary topics selected from recent developments in the field.
494. *Special Seminars*. I, II, S. 1-6 HR. Special seminars arranged for advanced graduate students.
495. *Independent Study*. I, II, S. 1-6 HR. Faculty supervised study of topics not available through regular course offerings.
496. *Graduate Seminar*. 1 HR. PR: Consent. It is anticipated that each graduate student will present at least one seminar to the assembled faculty and graduate student body of his/her program. (Graded S/U).
497. *Research*. 1-15 HR.
498. *Thesis*. 2-4 HR. PR: Consent.
499. *Graduate Colloquium*. 1-6 HR. PR: Consent. For graduate students not seeking course work but who wish to meet residence requirements, use University facilities, and participate in academic and cultural programs.

Division of Occupational Therapy

Reginald J. Urbanowski, OTR/L, MS, Chair.

Degree Offered: Masters of Occupational Therapy

Introduction

In fall 1993, the WV Board of Trustees approved the establishment of a new Master's degree program at West Virginia University. The program at WVU accepted its first students into the professional program in the fall semester of 1996. The academic and

WVU's Division of Occupational Therapy has been granted Developing Program Status by the Accreditation Council for Occupational Therapy Education (ACOTE) of the American Occupational Therapy Association (AOTA). AOTA's phone number is (301) 652-AOTA. Once accreditation of the program has been obtained, graduates will be able to sit for the national certification examination for the occupational therapist administered by the National Board for Certification in Occupational Therapy, Inc. (NBCOT). After successful completion of this exam, the individual will be an Occupational Therapist, Registered (OTR). Most states require licensure in order to practice; however, state licenses are usually based on the results of the NBCOT Certification Examination.

The Profession of Occupational Therapy

Occupational therapy is a health profession whose services are provided to people of all ages with physical, mental, or developmental disabilities. The purpose of occupational therapy is to help individuals achieve a maximum level of independence. The Occupational therapy is a health and rehabilitation profession designed to help people regain and build skills that are important for health, well-being, security, and happiness.

Occupational therapists work with people of all ages who, because of physical, developmental, social, or emotional deficits, need specialized assistance in learning skills to enable them to lead independent, productive, and satisfying lives.

According to the U.S. Bureau of Labor Statistics, there will be a 55 percent increase in the number of available positions by the year 2005. Occupational therapists work in schools, hospitals, rehabilitation centers, home health agencies, skilled nursing homes, and private practice. Average starting salary for new occupational therapists range between \$36,000 and \$39,000.

Application and Admission

Traditionally, students apply to the program during their second year of college. They must have a minimum of 63 - 65 hours of college credit which includes the prerequisites listed below. Students who already have a degree in another field are also eligible to apply. All applicants must meet the following criteria:

- Minimum GPA of 3.0, overall and prerequisites, (a higher GPA may be necessary given the competitive nature of the program).
- The students are required to have volunteer/work experience with people with disabilities. Students should contact the Division of Occupational Therapy to determine amount of hours required.
- Two letters of recommendation are required: one from an occupational therapist or supervisor of volunteer/work experiences and one from a professor who has recently taught the applicant.
- Completion of *all* prerequisite courses by the end of the semester of application (traditionally, second semester of sophomore year) is required.
- **Strong** consideration will be given to residency and a commitment to stay in West Virginia to practice after graduation.

Required Prerequisite Courses	Credits
English Composition	6
Physics (with lab)	8
General (Introductory) Psychology	3
Statistics (introductory)	3
Life-Span Developmental Psychology	3
Rural or Appalachian studies course in any discipline	3
Abnormal Psychology	3
Sociology or Anthropology	3
Communication Studies	3
Biology (with lab)	8
Completion of WVU's LSP requirements with courses in cluster A*	12
Chemistry (with lab)	4
Math 3 & 4 or 14	6

* Please consult the WVU Undergraduate Catalog for further information on Cluster requirements. Please note that three hours in either Cluster A or B courses must focus on a foreign, gender, or minority issue.

WVU Students must consult the Student Advising Center prior to enrolling in prerequisite courses. These courses may be taken at any institution which offers equivalent courses. Equivalence may be determined by contacting the transfer desk, Admissions and Records, West Virginia University, PO Box 6009, Morgantown, WV 26506-6009.

Persons interested in Occupational Therapy should obtain an application packet from the Admissions and Records Office (304) 293-3521, starting December 1 and completing that packet by March 1. A personal interview may be required.

Course of Study

Like many professional programs, the curriculum in the master's entry level occupational therapy program is fairly fixed and intense. The first professional year will include courses in basic sciences and introductory professional courses. The second and third progressional years will deal more specifically with training in occupational therapy theory and practice as administered across a wide variety of settings. *The professional curriculum includes three off-campus, full-time clinical experiences known as fieldwork.* Students are financially responsible for transportation, housing and meal expenses related to clinical assignments.

Year One:

<i>First Semester</i>	<i>Hrs.</i>	<i>Second Semester</i>	<i>Hrs.</i>
PHYS 241	4	EXPH 165	3
OTH 100	4	OTH 106	4
OTH 101	3	OTH 107	4
OTH 102	2	OTH 108	3
OTH 103	2	OTH 221	3
OTH 104	4	OTH 194	2
OTH 280	1	OTH 280	1
Total	20	Total	20

Year Two:

<i>First Semester</i>	<i>Hrs.</i>	<i>Second Semester</i>	<i>Hrs.</i>
OTH 194	2	OTH 216	2
OTH 202	2	OTH 217	3
OTH 204	4	OTH 219	3
OTH 206	3	OTH 232	4
OTH 208	3	OTH 235	3
OTH 230	3	OTH 280	1
OTH 280	1	OTH 194	2
Total	18	Total	18

<i>Summer</i>	<i>Hrs.</i>
OTH 240	3

Year Three

<i>First Semester</i>	<i>Hrs.</i>	<i>Second Semester</i>	<i>Hrs.</i>
OTH 300	3	OTH 350	3
OTH 301	3	OTH 351	3
OTH 302	3	OTH 353	3
OTH 303	2	OTH 395	6
OTH 305	3	OTH 380	2
OTH 320	3	Total	17
OTH 325	3		
OTH 380	2		
Total	22		

<i>Summer</i>	<i>Hrs.</i>
OTH 380	2
OTH 381	1
Total	3

Note: Course numbers are proposed and are subject to change.

Occupational Therapy (OTH)*

*Courses listed on previous page but not enumerated below are in the process of obtaining approval from the Faculty Senate at WVU.

201. *Clinical Sciences 2. I.* 4 HR. PR: OTH Student Status. Introduction to selected topics in clinical medicine which are basic to occupational therapy and physical therapy practice. Topics include metabolic and endocrine disorders, oncology, dermatology, wound care, burns, OBS, Alzheimer's, clinical neuropathies, and rheumatology. (Contact hours - 5)

202. *Clinical Decision Making 1.* 2 HR. PR: OTH Student Status. Continuation of preparation for critical thinking and decision making in the field using appropriate information and technology in a case study format. An emphasis on autonomous practice and referral decisions.

206. *Cardio-pulmonary Rehabilitation. I.* 3 HR. PR: OTH Student Status. Lectures on cardiovascular and pulmonary conditions including medical interventions. Discipline-specific laboratory sessions include stress testing, physical capacity assessment, ecological analysis, use of monitoring equipment, and evaluation and planning rehabilitation protocols. (Contact hours - 4)

208. *Tests and Measures in Occupational Therapy. I.* 3 Hr PR: Occupational Therapy Student Status. Presentation of test and measures used by occupational therapists in the assessment of various conditions. Emphasis will be placed on the clinical and functional evaluation of clients within the domain of occupational therapy practice. (Contact hours - 4)

216. *Professional Decision-Making. II.* 2 HR. Students are provided with opportunities to develop critical thinking clinical reasoning, and decision-making skills in occupational therapy. Emphasis is on autonomous practice and referral decisions.

217. *Occupational Therapy in Geriatrics. II.* 3 HR. Overview of normative aging using an occupational therapy frame of reference. Common problems of seniors are discussed.

219. *Professional Values. II.* 3 HR. An introduction to ethics and how it specifically applies to rural health and life in West Virginia. Students will be given an opportunity to explore their own conceptions of ethics in health care.

221. *Development Life Tasks. II.* 3 HR. Life-span human development across cognitive, psychosocial and neuromotor domains with particular emphasis on applications to physical or occupational therapy interventions. Cultural influences in health and illness.

230. *Occupational Therapy in Mental Health. I.* 3 HR. PR:Occupational Therapy Student Status. Clinical and functional science lectures pertaining to OT practice in mental health environments. Course includes introduction to occupational therapy, clinical and functional assessment, and management protocols. (Contact hours - 3)

232. *Occupational Therapy Interventions in Mental Health*. II. 4 HR. Interventions commonly used by occupational therapists in the field of mental health. Emphasis on group processes, life skills, reintegration strategies.

235. *Therapeutic Activity*. II. 3 HR. Students will develop skills in performance component analysis, performance context analysis, and occupational performance analysis.

280. *Current Topics in OTH*. I, II. 1-3 HR. (Not to exceed 18 HR.) A seminar course designed to provide a forum for discussing the frontiers of the occupational therapy profession. Topics will include: research in progress, new developments, and salient professional issues.

Division of Physical Therapy

MaryBeth Mandich, PT, Ph.D. Chair

Degree Offered: Masters of Physical Therapy

Introduction

The WVU Physical Therapy Program was established in 1970 under the auspices of the School of Medicine to help meet the need for physical therapists in West Virginia. The program is accredited by the Commission on Accreditation in Physical Therapy Education, a specialized accrediting body recognized by the Council on Postsecondary Accreditation. The West Virginia Board of Trustees approved the transition of the Physical Therapy Program at WVU from a bachelors degree program to its current entry-level masters degree status in May of 1996. Accreditation for this transition was obtained from the American Physical Therapy Association in May 1997.

Thirty full-time students are admitted each year. Preference is given to West Virginia residents. **A limited number of non-residents who have attended a West Virginia college or university, or who have other strong ties to the state, may also be considered.**

The Profession of Physical Therapy

Physical Therapy is a hands-on health care profession which promotes optimal health and function through the application of scientific principles to prevent, identify, assess, correct, or alleviate acute or prolonged movement dysfunction. The goal of physical therapy is to help individuals reach their maximum potential and to contribute to society while learning to live within the limits of their capabilities.

Physical Therapy is a rapidly growing health profession. According to recent statistics, career opportunities in physical therapy are expected to continue to increase through the year 2000. One factor contributing to the increased need for physical therapy services is the changing complexion of the population. As the "baby boom" generation ages, physical therapists will be in more demand to treat patients who are affected with arthritis, stroke, heart disease, and other prolonged-care conditions common to older people. As a consequence of society's increasing participation in sports and fitness activities, more physical therapists are needed in the health care system. The need for physical therapists will continue to increase with the development of innovative diagnostic and treatment methods, and equipment.

Physical Therapy offers a wide variety of career options in hospitals, private practice, corporate or industrial health centers, sports facilities, research institutions, rehabilitation centers, nursing homes, home health agencies, schools, pediatric centers, colleges, and universities. A license to practice physical therapy is required by all states.

Application and Admission

The following requirements must be met to apply to the WVU Physical Therapy Program:

1. Applicant must have a minimum cumulative GPA and a minimum prerequisite science GPA of 3.0.
2. Applicant must have a minimum of 60 hours of clinical volunteer or work experience in a physical therapy setting. This experience should be obtained in at least two (2) different settings.
3. Applicant must take the Allied Health Professions Admissions Test (AHPAT) prior to application deadline. The AHPAT is an aptitude test that measures proficiency in chemistry, biology, verbal ability, quantitative ability, and reading comprehension.
5. Applicant must have a minimum grade of C in each prerequisite course.
6. Applicant must have completed or be enrolled in the required courses listed below:

Required Prerequisite Courses

8 hrs	Biology with lab
8 hrs	Physics with lab
8 hrs	Chemistry with lab
3 hrs	General Psychology
3 hrs	Developmental Psychology (Life-span)
3 hrs	Introductory Statistics (Inferential & Descriptive)

WVU Course Equivalent

Biology 1, 2, 3, 4
Physics 1, 2
Chemistry 15, 16
Psychology 1
Psychology 141
Statistics 101

WVU Liberal Studies Requirements:

6 hrs	English Composition	English 1, 2
12 hrs	Cluster A Courses (Humanities & Fine Arts)*	
6 hrs	Cluster B Courses (Social & Behavioral Sciences)*	

* Please consult the WVU Undergraduate Catalog for further information on Cluster requirements. Please note that three hours in either Cluster A or B courses must focus on a foreign, gender, or minority issue.

The courses listed above are minimum requirements for application. Other recommended courses are: speech communication, any course dealing with Appalachian or rural studies, and an introduction to a computer science course. Students are encouraged to pursue studies in other courses of interest. Students who wish to substitute a course for one of those listed above should write for permission to the Chairperson of the Admissions Committee, Division of Physical Therapy. A photocopy of the course description from the school catalog or class syllabus of the proposed substitute must be enclosed. Applicants who complete any of their prerequisite courses at a college or university outside West Virginia must submit a catalog or photocopy of a catalog description of those courses.

Applicants who have met all program requirements are interviewed by the Physical Therapy Admissions Committee. Those considered to demonstrate the greatest potential for success are recommended for admission into the Program.

Students who meet the application requirements for the physical therapy program can obtain an application packet **beginning December 1** from the **Office of Admissions & Records, WVU Health Sciences Center, P O Box 9815, Morgantown, WV 26506-9815, phone (304) 293-3521**. All application materials must be received no later than February 15 for admission consideration into the next class.

Course of Study

Students admitted to the program complete a combination of classroom and laboratory work at the Health Sciences Center in Morgantown. Clinical education rotations are at various sites in West Virginia and other states.

Year One:

<i>First Semester</i>	<i>Hrs.</i>	<i>Second Semester</i>	<i>Hrs.</i>
PHYS 241	4	EXPH 165	3
PT 100	4	PT 106	4
PT 101	3	PT 107	4
PT 102	2	PT 108	3
PT 103	2	PT 109	1
PT 104	4	PT 184	1
Total	19	PT 221	3
		Total	19

Summer

PT 199	3
--------------	---

Year Two:

<i>First Semester</i>	<i>Hrs.</i>	<i>Second Semester</i>	<i>Hrs.</i>
PT 185	2	PT 216	2
PT 201	4	PT 217	2
PT 202	2	PT 219	3
PT 204	3	PT 220	4
PT 206	3	PT 225	3
PT 210	4	PT 250	4
Total	18	Total	18

Summer

PT 295	6
--------------	---

Year Three:

<i>First Semester</i>	<i>Hrs.</i>	<i>Second Semester</i>	<i>Hrs.</i>
PT 300	2	PT 350	3
PT 301	3	PT 351	3
PT 302	3	PT 353	3
PT 303	2	PT 354	6
PT 305	3	PT 391	3
PT 306	4	Total	18
Total	17		

Summer

PT 380	2
PT 381	1
PT 382	1-3
Total	4-6

Note: Course numbers are proposed and subject to change

Physical Therapy (PT)

*Courses listed above but not enumerated below are in the process of obtaining approval from the Faculty Senate at WVU.

200. *Foundations of Physical Therapy*. I. 3 HR. Introduction to physical therapy profession including: history, role of professional associations, professional education and development and professional issues. Other content areas: principles of medical ethics; health communication, the medical record and documentation.

201. *Clinical Sciences 2*. 4 HR. Introduction to selected topics in clinical medicine which are basic to physical therapy practice. Topics include metabolic and endocrine disorders, oncology, dermatology, wound care and burns. (Contact hours - 4)

202. *Clinical Decision Making 1*. 2 HR. Continuation of preparation of critical thinking and decision making in the clinic. Emphasis is on autonomous practice and decisions regarding referral to other members of the health care team. Students work in small groups in a problem based learning format. (Contact hours - 2)

206. *Cardiopulmonary Rehabilitation*. 3 HR. Correlation of anatomy, physiology, and pathology for the treatment of cardiopulmonary conditions. Laboratory in cardiopulmonary evaluation, cardiac and pulmonary rehabilitation procedures, and respiratory treatment techniques. Lecture and case presentations in appropriate medical and surgical conditions. (Contact hours - 3)

221. *Developmental Life Tasks*. II. 3 HR. Life-span human development across cognitive, psychosocial and neuromotor domains with particular emphasis on applications to physical or occupational therapy interventions. Cultural influences in health and illness.

290. *Clinical Education 4*. S. 1-12 HR. Three full-time summer affiliations of six to eight weeks each in a variety of extramural facilities, such as a general hospital, children's facilities, rehabilitation services, and public health. (Graded Pass/Fail only.)

391. *Advanced Topics*. 1-6 HR.

490. *Teaching Practicum*. I, II. 1-3 HR.

494. *Special Seminars*. I, II, S. 1-6 HR. Special seminars arranged for advanced graduate students.

Medical Technology

Jean D. Holter, Director of the Program; Graduate Coordinator

2138 Health Sciences North

Degree Offered: Master of Science

The WVU medical technology graduate program prepares graduate medical technologists for positions either as administrators and teachers in medical technology educational programs or as supervisors and administrators of the clinical laboratory. The primary objective is to assist in development of knowledge in an area in administration, in education, or a special area of interest selected by the student, which may be a special medical laboratory science as the specific area applies to laboratory medicine. Areas of emphasis include clinical chemistry, clinical microbiology, hematology, and immunohematology and blood banking. The specific course work requirements for the master of science degree rests with the graduate advisor in the student's specific area of interest.

Admission

Applicants must have a baccalaureate degree in medical technology from an accredited institution or a baccalaureate degree in an allied field and be a certified medical technologist with an acceptable certifying agency. Information concerning the medical technology undergraduate program may be found in the *WVU Health Sciences Catalog* and the *WVU Undergraduate Catalog*.

Basis for Evaluation The area of concentration in medical technology desired by the student is considered in the evaluation of the undergraduate as follows:

- Individuals who desire to do special study in clinical chemistry, hematology, or immunohematology and blood banking must have completed eight hours of physics, three hours of mathematics, and four hours of organic chemistry on the college level.
- Individuals who desire to do special study in microbiology must have completed four hours of organic chemistry and 16 hours of biological sciences.
- A minimum of one year's experience in a clinical laboratory is required for admission.

Students will be required to make up deficiencies in the above, as well as other deficiencies deemed necessary by the advisor.

GPA Applicants must have a minimum undergraduate grade-point average of 2.5 (based on A = 4.0 grade points) for admission.

GRE All applicants are required to take the general aptitude part of the Graduate Record Examination. Results should be sent to the WVU Medical Technology Programs Office, P.O. Box 9211, Morgantown, WV 26506-9211.

Letters of Reference Two letters of reference must be on file in the Medical Technology Office. One letter should be from the major advisor in the undergraduate college and another from the immediate supervisor of the applicant's present position. An interview will be requested for all applicants who meet the requirements for admission.

Application Applicants are selected for admission on the basis of scholastic standing, recommendations, and interest in the field of medical technology. The number of applicants accepted is necessarily limited by the available facilities; and in general, applicants with the most experience are considered first.

1. A preliminary application is filed in the Medical Technology Programs Office.
2. Two letters of recommendation are sent to the Medical Technology Programs Office.

After approval of the preliminary application, the admission procedure is the same as for other WVU graduate programs.

A personal interview is required before final admission to the program. This interview will give the graduate student an opportunity to evaluate the program and to determine if the program will offer the educational opportunities which the student desires.

Course of Study

It is expected that the students entering the graduate program in medical technology will have a goal in mind and a special field of interest in medical technology. A minimum of 36 semester hours of credit, including a research problem, is required. The student selects a major area of concentration from either education, supervision, or administration, and a minor area from clinical microbiology, clinical chemistry, clinical hematology, or immunohematology. A minimum of 15 semester hours of course work from the following courses is required, depending upon the major area of concentration.

ED P 320 *Introduction to Research* (required).

- If the major area is **education**, the following three-hour courses are available:

CHPR 320 *Roles and Functions of Health Education*

ED A 320 *Personnel Administration*

ED A 351 *Administrative Procedures in Adult Education*

ED A 462 *Higher Education Law*

ED A 463 *Higher Education Finance*

ED F 320 *Philosophic Systems and Education*.

- If the major area is **supervision and/or administration**, the following three-hour courses are available:

ED A 320 *Personnel Administration*

ED A 462 *Higher Education Law*

ED A 463 *Higher Education Finance*

PUBA 341 *Administrative Organization and Management*

PUBA 344 *Public Personnel Administration*

PUBA 345 *Public Administration and Policy Development*

- Other three-hour courses available for **either major** for additional credit are:

ED P 231 *Sampling Methods*

ED P 260 *Medical and Microcomputers in Instruction*

ED P 301 *Introductory Behavior Analysis: Human Resources*

ED P 321 *Design of Experiments*

ED P 343 *Statistical Analysis in Education*

ED P 364 *Precision Teaching*

ED P 370 *Programmatic Research*

CHPR 308 *Community Health: Death Education*

CHPR 309 *Community Health: Drug Education*

Recommended:

ED P 311 *Statistical Methods*,

STAT 311 *Statistical Methods*, **or**

CCMD 311 *Biostatistics*

Other courses to complete 36 semester hours are selected by the student and the advisor in the area of concentration selected by the student. Students may select courses in departments in schools other than the School of Medicine.

Minimum Hours

All students must complete a minimum of 18 semester hours in a science related to medical technology including seminar (three hours) and problem study (six hours).

In addition, at the discretion of the student's advisor, other requirements in teaching, supervision, and administration may be necessary.

Plan of Study

The advisor formulates with the student a plan of study for the entire graduate program. This plan is usually made at the end of the first semester of the student's graduate study. The plan of study is signed by the advisor and student and sent to the Health Sciences Graduate Program Office for approval. The original plan of study is returned to the Medical Technology Office to be put in the student's file.

A final written comprehensive examination in the major and minor interest areas is given approximately one month before the oral defense. An oral defense of the problem study is given about one month after submission of the problem study in its final form to the student's graduate committee.

Time Limitations

All requirements for the master of science degree, as outlined in this catalog, must be fulfilled. These requirements can be fulfilled in three semesters of full-time work, but ordinarily at least four semesters are required for completion of the degree requirements. Degree candidates must have a 3.0 grade-point average and must have removed all incomplete grades and deficiencies. All students must complete a problem study (see MTEC 397).

Medical Technology (MTEC)

200. Orientation. I, II, S. No credit. (For senior students.) Principles and practices of medical technology in relation to the hospital and clinics. (Pass-Fail grading only.)

201. Phlebotomy. I, II, S. 1 HR. PR: Enrollment in Medical Technology Program, MTEC 100 and MTEC 101. Clinical laboratory practice, including venipuncture, finger sticks, and heel sticks; isolation, universal precaution and other safety techniques are included.

202. *Laboratory Math, Quality Control, Computers*. I. 2 HR. Lectures and practice sessions in laboratory mathematics, techniques, and calculations in quality control and an introduction to computers to include terminology and basic operation.

210. *Clinical Laboratory Mycology*. II. 1 HR. How to isolate and identify the more commonly encountered pathogenic fungi as well as those fungi frequently seen as laboratory contaminants. The course will include basic taxonomy, isolation procedures, and identifying characteristics.

220. *Immunohematology and Blood Banking*. I, II. 2 HR. Lectures on immunohematology and blood banking theory and practice.

221. *Immunohematology and Blood Banking Laboratory*. Arranged. 5 HR. Clinical laboratory practice in blood banking procedures. Emphasis on procedures required for collection and preparation of blood and blood components for transfusion, special techniques, antibody studies, and problem solving.

229. *Basic Clinical Chemistry*. II. 1 HR. PR: Students in Medical Technology Program. Basic clinical chemistry procedures and theory. 1 HR. lec.

230. *Clinical Chemistry*. I, II. 2 HR. Lectures on principles of clinical chemistry procedures; their clinical significance and implication in diagnosis.

231. *Clinical Chemistry Laboratory*. Arranged. 5 HR. Practice in the clinical chemistry laboratory.

240. *Clinical Hematology*. I, II. 2 HR. Lectures in hematologic theory and practice.

241. *Clinical Hematology Laboratory*. Arranged. 5 HR. Application of hematological principles to laboratory medicine. Emphasis on routine and specialized procedures, evaluation and problem solving.

250. *Clinical Microbiology*. I, II. 2 HR. Presentation and discussion of current methodology employed in the processing of clinical microbiology specimens, isolation and identification of pathogenic microorganisms, and determination of antimicrobial sensitivities.

251. *Clinical Microbiology Laboratory*. Arranged. 5 HR. Practice in the clinical microbiology laboratory to include isolation and identification of microorganisms; processing of specimens and antibiograms. Includes experiences in pathogenic mycology and parasitology.

260. *Instrumentation*. I, II, S. 2 HR. Principles of clinical laboratory instrumentation for medical technologists including principles of operation, maintenance, and troubleshooting.

265. *Laboratory Management*. I, II. 2 HR. Laboratory organization, economics, ethics, and records.

270. *Clinical Microscopy*. I, II, S. 1 HR. PR: Senior standing in Medical Technology or consent. Lecture to cover the screening of body fluids (urine, gastric juices, etc.) for abnormalities and pregnancy testing.

271. *Clinical Microscopy Laboratory*. I, II, S. 1 HR. PR: Senior standing in Medical Technology, or consent. Laboratory Practicum in urinalysis, gastric analysis, pregnancy test, and other procedures.

275. *Medical Relevance of Laboratory Analysis*. 1 HR. PR: Senior status in Medical Technology. Case presentations of pathologic entities encountered in the clinical laboratory. (Pass/Fail grading.)

280. *Clinical Immunology*. I, II, S. 3 HR. Lectures and laboratory practice in the principles of clinical immunology and their relationship to clinical laboratory technology.

291. *Research, Educational Methodology*. II. 2 HR. Lectures in ethics, techniques of research, and techniques of educational methodology for medical technology students.

300. *Seminar*. I, II, S. 1 HR. Seminars include topics in laboratory management and education in medical technology, and timely topics. Minimum of three semester hours to include all three topics is required of all graduate students in the medical technology program.

391. *Advanced Topics*. I, II, S. 1-6 HR. PR: Consent. Investigation in advanced subjects which are not covered in regularly scheduled courses.

397. *Research*. I, II, S. 1-15 HR. PR: Consent. Research activities leading to a thesis, problem report, research paper, or equivalent scholarly project.

Microbiology and Immunology

John B. Barnett, Chairperson of the Department

James M. Sheil, Graduate Coordinator

2095 Health Sciences Center - North

e-mail: Jbarnett@wvu.edu also jsheil@wvu.edu

<http://www.hsc.wvu.edu>

Degrees Offered: Doctor of Philosophy, Master of Science,

The Department of Microbiology and Immunology offers programs of study leading to the degrees of doctor of philosophy in microbiology and immunology. The department also offers a masters of science degree. Students with an undergraduate degree can apply to either the M.S. or Ph.D. program. The major purpose of graduate education in microbiology and immunology is research training. The basic philosophy of the department is that the students acquire a strong foundation in basic concepts of microbiology and immunology and have flexibility in choosing advanced course work in their specific areas of interest.

Application

Applicants to the graduate program of the Department of Microbiology and Immunology must have earned a bachelor or master's degree. Applicants should have a strong background in biological sciences, organic chemistry, physics, and mathematics. Applicants must submit a departmental application form, three letters of recommendation, and Graduate Record Exam (GRE) scores to the chairperson, Admissions Committee, Department of Microbiology and Immunology, Robert C. Byrd Health Sciences Center, West Virginia University, Morgantown, WV 26506-9177. In addition, all college transcripts and an official application for admission must be sent directly to the WVU Office of Admissions and Records, P.O. Box 6009, Morgantown, WV 26506-6009. Applicants for admission to a degree program should have a grade point average of 3.0 or better. GRE scores are used as one of the selection criteria for admission to the department's graduate program. Although no minimum score is required for consideration, successful applicants usually have a combined score of 1500 or greater on the general GRE. International students must have a TOEFL score of 550. Admission to the department and award of assistantships is considered throughout the year and early application is encouraged. Applicants desiring financial aid should complete their application before March 1. All applications must be completed by June for fall admission.

Course Requirements

Every student must take the following courses or demonstrate proficiency by examination in each of the following areas: Microbiology (MBIM 317) *Graduate Microbiology and Immunology* and MBIM 391 *Advanced Topics* (laboratory rotation). In addition, two semesters of *Cell and Molecular Biochemistry* (BIOCH 399), are required. The remainder of the course work is selected by the student and the advisory committee from the graduate course offerings of department, school, or university. Enrollment in MBIM 496 *Graduate Seminar* is required each semester that the student is in residence. Full time students in the Department of Microbiology and Immunology are required to participate in teaching during of residence in the department.

Master of Science

The master of science program requires 30 hours of course work, of which at least 20 hours must be in microbiology and immunology. Six hours must be in research (MBIM 397 *Master's Degree Research and Thesis*). A thesis representing original research and a final oral examination are required. A grade-point average of at least 3.0 must be maintained throughout the program.

Doctor of Philosophy

Students with either a bachelor's or master's degree can apply to the Ph.D. program. The doctoral candidate with an M.S. degree from another department must have had course work or demonstrate knowledge in microbiology, immunology, and biochemistry equivalent to that of a master's student in the department. In addition, the doctoral student will take additional course work as determined by the student's graduate research advisory committee. A minimum of nine hours in microbiology 491 courses or selected advanced courses from other departments is required. Where appropriate, course work in related subjects such as computer science, cell biology, biochemistry or statistics will be required. MBIM 496 *Seminar* is a required course each semester that the student is in residence. The student will maintain a grade point average of 3.0 or better. The doctor of philosophy degree requires a dissertation representing the results of an original research investigation. Candidacy to the Ph.D. degree program requires a passing score on a comprehensive written exam on microbiology and immunology, and a preliminary oral examination. The written qualifying exam is given at the end of the first year of residence. The preliminary oral exam is normally held after two years of residence. Ph.D. candidates must pass a final oral examination in defense of the dissertation. This final oral examination is given after completion of the research project and submission of an acceptable dissertation.

The Department of Microbiology and Immunology has informal journal clubs in immunology, virology, and in microbiology. These are designed to help students develop skills in reading, interpreting and discussing current research articles. All students are expected to participate in one or more journal clubs per year.

For application materials, a description of faculty research interests, or guidelines for graduate students in the Department of Microbiology and Immunology, write to the Chairperson, Admissions and Scholarship Committee, Department of Microbiology, WVU Health Sciences Center, Morgantown, WV 26506-9177.

Areas of Current Research

Pathogenic Bacteriology: mode of action of microbial products in pathogenicity; oral microbiology; biology of spirochetes; microbial adherence.

Mycology: pathobiology of medical mycoses; environmental health research implications of fungal and algal toxicoses.

Physiology: nutrition and metabolism of a variety of pathogenic microorganisms, growth and protein synthesis in obligate intracellular bacteria.

Genetics: basic studies in the mechanisms of genetics including transfer of genetic information; recombinant DNA studies.

Virology: mechanism of retrovirus replication and mutation.

Parasitology: host-parasite relationships between helminth parasites and insects and vertebrate hosts; endosymbionts in protozoa.

Immunology: developmental aspects of immunity, immunopathology of pulmonary disease; inflammatory response to inhaled organisms; mechanisms of T-cell function; effects of xenobiotic exposure on the immune system.

Tumor biology: mechanisms of oncogenesis and signal transduction; functional analysis of oncogenic proteins.

Other programs: detection of environmental pollutants; effect of environmental agents on host resistance.

Microbiology and Immunology (MBIM)

220. *Pathogenic Microbiology*. (For pharmacy students.) 4 HR. PR or Conc.: Biochemistry. Pathogenic microorganisms, including immunology and antimicrobial agents.

223. *Microbiology*. (For medical technology students; other students with consent.) II. 5 HR. PR or Conc.: Biochemistry. Basic microbiology. Emphasis on immunology, pathogenic microorganisms, and clinical laboratory techniques.

224. *Parasitology*. (For medical technology students; other students with consent.) II. 4 HR. Study of animal parasites and disease vectors with emphasis on disease manifestations, parasite biology and laboratory diagnosis.

301. *Microbiology*. (For medical students and a limited number of graduate students in the Health Science Center's basic science departments.) I. 4-7 HR. PR: Organic chemistry, biochemistry. Detailed study of pathogenic microorganisms and immunology. Emphasis on use of microbiology in solving clinical problems.

302. *Microbiology*. (For Dental students only.) I. 5 HR. PR: Organic chemistry. Detailed study of pathogenic microorganisms. Emphasis on oral flora.

310. *Structure and Activities of Microorganisms*. II. 2-7 HR. PR or Conc.: Biochemistry, Consent. Molecular biology of *e. coli* and other selected organisms.

311. *Prin Infection & Resist*. 1-5 HR.

317. *Special Problems in Microbiology*. I, II, S. 1-7 HR.

{A. *Graduate Immunology*. I. 2 HR.

B. *Virology*. I. 1 HR. PR: Consent.

C. *Parasitology laboratory*. II. 1 HR. PR: Consent.

D. *Graduate Pathogenic Microbiology*. II. 3 HR. PR: Consent.}

325. *Medical Mycology*. 4 HR.

327. *Parasitology*. (For graduate students.) II. 4 HR. PR: Consent. Study of animal parasites and disease vectors with emphasis on disease manifestations, parasite biology, Laboratory diagnosis, and current concepts in parasitological research.

391. *Advanced Topics*. I, II, S. 1-6 HR. PR: Consent. Investigation of advanced topics not covered 3 HR. PR: Consent; For graduate students in Microbiology and Immunology. Assigned study to develop research laboratory techniques. Graded S or U. B. Immunology. I, II, S. VR. PR: Consent. Independent study in immunology. ? in regularly scheduled courses. (Graded S/U).

397. *Research*. I, II, S. 1-15 HR. PR: Consent. Research activities leading to a thesis, problem report, research paper, or equivalent scholarly project. Students may enroll more than once. (Graded S or U). Student is required to pursue study on a problem in the student's area of concentration.

399. *Special Topics in Microbiology, Cell Biology*. II. 3 HR. PR: Biochemistry; 1 yr. undergraduate biology; consent. Lectures in selected areas of cell biology.

490. *Teaching Practicum*. I and II. 1-3 HR. PR: Consent. Supervised practices in teaching of microbiology. Graded as S or U.

491. *Advanced Study. Pathogenic Bacteriology*. I. 1-6 HR. PR: MBIM 301 and 310 or equiv. Consent. Pathogenic bacteriology with an emphasis on the mechanisms of pathogenesis. Topics include microbial adherence, toxin production and mechanisms, and normal flora and disease.

{*Clinical Laboratory Bacteriology*. II. VR. PR: MBIM 301, 310, or equiv. Consent. Lectures on the identification of pathogenic microorganisms with an emphasis on bacteria. The laboratory includes a rotation through the hospital clinical microbiology laboratory. Limited enrollment. Graded S or U.

{*Microbial Genetics*. I. 3 HR. PR: MBIM 310 or equiv. Consent. Molecular aspects of mutation, gene transfer mechanisms, genetic mapping, and genetic control using bacteria and bacteriophage systems as models.

{*Microbial Metabolism*. II. 2 HR. PR: MBIM 310, or equiv., biochemistry, consent. Physiology, metabolism, and regulation of representative microbial groups. Microbial Metabolism Laboratory. II. 1 HR. PR: Open to departmental graduate students only. Research techniques in metabolic regulation.

{*Medical Mycology*. I. 3 HR. PR: Consent. Advanced study of fungi of medical importance, including the pathobiology of mycoses and toxicoses.

{*Molecular Virology*. I. 3 HR. PR: MBIM 301, 310, or equiv., consent. Molecular biology of viruses that are important both biologically and medically. Includes a basic introduction to replication and genetics as well as current topics in molecular virology.

{*Developmental Immunology*. I. 3 HR. PR: Consent. Examines the development of the lymphoid components of the immune system (B and T lymphocytes) and inter actions leading to effective immune responses.

{*Cellular and Genetic Basis of the Immune Responses*. I. 3 HR. PR: Consent. Emphasis is on contemporary issues in understanding the genetic and cellular elements that impact immune responses.

{*Contemporary Topics in Immunobiology*. II. 3 HR. PR: Consent. Detailed coverage of major issues of contemporary research in immunobiology.

{*Systems Immunology*. II. 3 HR. PR: Consent. An integrative systems approach to immunology stressing how immunologic recognition is translated into biologic consequences. Advanced treatment of different aspects of the efferent arm of immune responses.}

492. *Directed Study*. I, II, S. 1-6 HR. Directed study, readings, and research.

493. *Special Topics*. I, II, S. 1-6 HR. A study of contemporary topics selected from recent developments in the field.

494. *Special Seminars*. 1-6 HR. Special seminars arranged for advanced graduate students.

496. *Seminar*. I, II. 1 HR. PR: Consent. Graduate students present at least one seminar to assembled faculty and students in Microbiology and Immunology. Graded S or U.

497. *Research or Dissertation*. I, II, S. 1-15 HR. Students may enroll more than once. Graded S or U.

498. *Thesis*. 2-4 HR. PR: Consent.

499. *Graduate Colloquium*. 1-6 HR.

Pharmacology and Toxicology

William W. Fleming, Chairperson of the Department

Robert Craig, Graduate Coordinator

3151 Health Sciences North

Degrees Offered: Master of Science, Doctor of Philosophy

Pharmacology and toxicology involve all aspects of the action of drugs on living systems and their constituent parts. These range from the chemical reactions taking place within cells to the evaluation of a drug in the treatment of human disease. The Department of Pharmacology and Toxicology offers graduate studies leading to the degrees of master of science and doctor of philosophy, with research concentrations in such areas as cellular and molecular pharmacology, autonomic pharmacology, biochemical pharmacology, neuropharmacology, cardiovascular pharmacology, endocrine pharmacology, and renal, hepatic, and pulmonary toxicology.

Admission

Regular applicants for the graduate program in pharmacology and toxicology should present, as a minimum, the following undergraduate courses: one semester of biology; two semesters of physics; one semester of calculus; four semesters of chemistry including two semesters of organic chemistry. Two letters of recommendation from science professors, an official transcript, and the results of the Graduate Record Examination are also required. The prospective student should have a minimum 3.0 overall grade-point average at the undergraduate level.

Financial Aid

In general, students requesting financial support should have all credentials forwarded by February 1. For additional information write to the Director of Graduate Studies, Department of Pharmacology and Toxicology, WVU Health Sciences Center, Morgantown, WV 26506.

Master of Science

Ordinarily the department does not accept graduate students solely into a master's program. However, the master's degree is offered and is available as an intermediate degree en route to the Ph.D. Its primary function, as viewed by the faculty, is as an aid to the student new to research for the formulation, conduct, and writing of an abbreviated, but complete, independent research project. Most students, with the faculty's concurrence, choose to proceed directly with their doctoral research without a master's degree.

Doctor of Philosophy

Before official admission to candidacy for the doctorate, the student must satisfactorily complete a grant-writing exercise, an acceptable progress report, and an oral comprehensive qualifying examination.

Doctoral Committee/Examinations A doctoral examining committee will be formed at the time of submission of the grant proposal (at the beginning of the third year in the program). The committee will generally consist of at least three members from within the Department of Pharmacology and Toxicology and two from outside the department. Before any doctoral committee is appointed, its membership must be approved by the department's faculty. The committee will then meet with the student to approve the grant-writing exercise and to discuss the details of the proposed dissertation research.

Regardless of whether the student takes an M.S. or elects to do a progress report, he/she and the committee must agree on the final plan for the dissertation research. The committee is to be informed if major changes in the plan are contemplated and will meet periodically with the student to discuss his/her progress. Three or four months before the completion of the research project, the committee will again meet with the student to decide specific details of the dissertation preparation.

The oral preliminary examination will be held in early January of the student's third year in the program. The scheduling of the preliminary examination is contingent upon successful completion of all work to that date, including a satisfactory grant application. The student's doctoral committee will constitute the oral examining body.

If the student successfully passes the oral examination, a progress report should be submitted to his/her dissertation committee on or about March 1 of the third year.

If a student is not successful in the oral preliminary examination, the committee may recommend a second attempt to take place not less than one nor more than three months later. Alternatively, the committee may recommend to the entire faculty that the student should write a master's thesis.

Progress Report A progress report is expected to be written by each student in the program, except those students who are receiving an M.S. degree. M.S. students will write a master's thesis. The progress report should be written in the style of a dissertation and should be presented in an acceptable form to the dissertation committee on or about March 1 of the student's third year in the program. The student will defend the progress report before the dissertation committee.

Dissertation Upon admission to candidacy for the degree of doctor of philosophy, the candidate must select a topic for the dissertation under the direction of the candidate's advisor, complete a dissertation which makes a contribution to knowledge in the candidate's area of concentration, and pass an oral examination based primarily upon the dissertation. After successful completion of the oral examination and submission of the final copy of the dissertation, the candidate will be recommended for the degree.

Research Areas

Autonomic pharmacology: autonomic regulation of the cardiovascular system and of smooth muscle; sensitivity to autonomic drugs; electrophysiological studies of cardiac and smooth muscle.

Chemotherapy: antimalarial agents, anticancer agents, effects of pharmacological agents on single-cell organisms.

Biochemical pharmacology: drug metabolism, effects of drugs on lipid and nucleic acid metabolism, metabolism of environmental substances to carcinogens.

Molecular pharmacology: interaction of drugs and hormones with nucleic acids, molecular mechanisms of signal transduction.

Cellular pharmacology: mechanism of interaction of receptors with second messenger systems, function of ion channels.

Endocrine pharmacology: mechanism of action of steroids, metabolism of sex accessory tissues, relationship of hormones to tumor growth and development.

Neuropharmacology: biochemical basis of epilepsy, mechanism of action of anticonvulsant drugs, neuromediators in the central nervous system, electrophysiology of neurons.

Toxicology: metabolism of toxic agents, pulmonary toxicology, renal toxicology, environmental toxicology, and perinatal pharmacology and toxicology.

Pharmacology and Toxicology (PCOL)

243. *Pharmacology for Pharmacy Students*. I. 4 HR. PR: Completion of first year in Pharmacy; approval of course director. Principles, pharmacodynamic actions, and therapeutic applications of clinically useful drugs.

360. *Pharmacology and Therapeutics*. (For dental and graduate students.) I. 4 HR. PR: Dental student standing or consent. Lecture and demonstrations on pharmacological actions and therapeutic uses of drugs.

361. *Pharmacology* (For medical students and a limited number of regular, full-time graduate students in basic medical science departments.) II. 1-6 HR. PR: Consent of department chairperson. Lecture-conference-laboratory on principles, pharmacodynamic actions, and therapeutic applications of clinically useful drugs.

362. *Occupational Toxicology*. II. 3 HR. PR: Consent. General principles of toxicology with special emphasis on occupational health. Classes of chemicals which pose problems in the workplace will be emphasized.

364. *Advanced Pharmacology*. I. (Alternate years.) 1-6 PR: PCOL 361 or consent. Advanced lectures and discussion of general principles of pharmacology and toxicology and advanced lectures in biochemical, endocrine, pulmonary, and cardiovascular pharmacology. 1-6 HR. lec. (Offered every second year.)

367. *Advanced Neuropharmacology*. I. 1-6 HR. PR: PCOL 361 or consent. Advanced lectures and discussion on drug receptor theory, neurophysiological aspects of pharmacology, supersensitivity, and the actions of drugs on the central and peripheral nervous system. 1-6 HR. lec. (Offered every second year.)

461. *Seminar in Pharmacology*. I, II. 1 HR. per sem. PR: PCOL 361 or graduate status in basic medical sciences.

462. *Literature Survey*. I, II. 1 HR. per sem. PR: Graduate status in pharmacology and toxicology. Current literature pertinent to pharmacology and toxicology including journals of allied biological sciences.

490. *Teaching Practicum*. I, II. 1-3 HR. per sem. PR: PCOL 361 and consent. (For advanced graduate students.) Critical evaluation of preparation and delivery of lectures in specified areas of pharmacology and toxicology.

491. *Advanced Study*. I, II. 1-6 HR. PR: Consent of chairperson.

493. *Special Topics*. 1-6 HR.

497. *Research*. I, II, S. 1-15 HR. per semester.

Physiology

George Hedge, Acting Chairperson of the Department

Matthew Boegehold, Graduate Coordinator

3051 Health Sciences North

Degrees Offered: Master of Science, Doctor of Philosophy

The doctor of philosophy program is designed to produce physiologists of high quality, capable of conducting independent research and being effective teachers. Students are exposed to all aspects of physiology and a variety of related sciences. Our graduates, as a result of this rigorous training, may pursue careers in any area of physiology and can interact creatively with scientists in related fields. The master's program an introduction to research in physiology for students interested in, but not yet committed to, a research career. Students in this program receive training in the fundamentals of physiology and experience in a research laboratory.

Admission Requirements

Applicants should have a strong background in biology and/or chemistry. In addition to a basic biology course, it is strongly recommended that applicants have taken cellular or molecular biology and an introductory physiology course; a course on comparative anatomy also provides particularly useful background information. Inorganic and organic chemistry are basic requirements, while physical chemistry is recommended, but not required. As several areas of physiology require an understanding of the fundamentals of calculus and physics, introductory courses on these subjects are also essential.

The department requires the following materials for consideration for the M.S. or Ph.D. program: three letters of recommendation; transcripts of all undergraduate and graduate grades; a completed departmental application form; and Graduate Record Examination scores (aptitude only). Students from non-English speaking countries also need to pass the Test of English as a Foreign Language (TOEFL). The minimum acceptable score is 550. A bachelor's degree or equivalent is required for admission; a M.S. degree is not a prerequisite for the Ph.D. program.

A complete application kit and detailed descriptions of the degree programs can be obtained by writing to the Graduate Coordinator, Department of Physiology, Robert C. Byrd HSC of WVU, P.O. Box 9229, Morgantown, WV 26505-9229. Although applications may be submitted as late as March 1 of the year of matriculation, applications must be received before February 1 to be considered for financial aid.

Master of Science

The first two semesters are devoted largely to course work in physiology (12 hours of graduate physiology, four hours of neurophysiology, and four hours of physiological methods). An additional course requirement is cellular and molecular biochemistry (four hours per semester). Students are also introduced to the research interests of the faculty through the physiological methods course, which includes rotations in two or more faculty member laboratories. At the end of the second semester, students pick a thesis advisor and begin work in that laboratory during the summer. The second year is spent primarily on research for and writing of the master's thesis. Students are required to present a research seminar during the second year.

Doctor of Philosophy

The first year curriculum familiarizes students with the basic information and principles that form a background for advanced work in physiology. Much of the first year is devoted to graduate physiology, neurophysiology, and cellular and molecular biochemistry (four hours per semester). In the second year, the student will take advanced physiology, which emphasizes critical appraisal of the current research literature.

Faculty Research In addition to the above course work, students are introduced to the research interests of the physiology faculty in the first year through the graduate colloquium and laboratory rotations. The latter are designed to help students choose a dissertation advisor by exposing them to the experimental approaches and techniques used in different laboratories within the department.

During the first summer, students are expected to begin research projects in a departmental research laboratory of their choice. This allows a student to explore an area of research interest without a firm commitment to pursue a dissertation project in that laboratory.

During the second year, the student combines course work with the continuing development of research interests. A graduate advisor is selected during this year. Courses include: advanced physiology (six hours), graduate colloquium (two hours), graduate seminar (one hour), and a teaching practicum. Through the teaching practicum, the

student begins to develop his/her teaching skills. The purposes of the graduate colloquium and seminar are twofold. First, they give students an opportunity to become informed of the latest scientific advances. Second, students have an opportunity to develop and practice presentation of research seminars. In addition to presentations by faculty and students from the Department of Physiology, faculty members from other departments at WVU and from other institutions are invited to present seminars in the program.

Qualifying Examination After successful completion of the second academic year, the students take a two-part qualifying examination. The exam consists of a comprehensive written examination covering all of the major areas of physiology, followed by a written and oral research design examination. Upon successful completion of the qualifying examination, the student is admitted to candidacy for the degree of doctor of philosophy.

Teaching During the third and fourth years the student may enroll in elective courses. Yearly participation in the teaching practicum provides additional experience in delivering lectures to undergraduate and professional students. However, the student's major effort is directed toward dissertation research. Results of this effort are presented annually in the graduate colloquium. During these years the student will attend and present papers at national meetings of scientific societies (e.g., American Physiological Society, Biophysical Society, Endocrine Society, Experimental Biology, Society for Neurosciences). The Ph.D. degree generally can be completed in four to five years.

Faculty laboratories offer opportunities for research in cardiovascular, cell, endocrine, gastrointestinal, muscle, neural, renal, and respiratory physiology.

Physiology (PSIO)

241. *Mechanisms of Body Function*. 4 HR. PR: College chemistry, biology, physics, and algebra or graduate status and consent. A systematic examination of the homeostatic functions of the human body with emphasis on the physicochemical mechanisms involved. Pathophysiology and clinical correlations are introduced in relation to normal physiology.

341. *Physiological Methods 1*. II. 1-5 HR. PR: Consent. Research techniques and strategies for physiology.

342. *Physiological Methods 2*. II. 1-4 HR. PR: Consent. Research techniques and strategies for physiology.

343. *Fundamentals of Physiology*. (For dental students and a limited number of regular full-time graduate students in the Health Sciences Center's basic sciences departments.) I. 5 HR. PR: College physics, algebra, chemistry, and consent of department chairperson. Analysis of basic facts and concepts relating to cellular processes, organ systems, and their control. 3 lec., 1 conf., 1 lab.

344. *Medical Physiology 1*. (For medical and a limited number of regular full-time graduate students in the Health Sciences Center's basic sciences departments.) I. 5 HR. PR: College physics, algebra, chemistry, and consent of department chairperson. Analysis of basic facts and concepts relating to cellular processes, organ systems, and their control with clinical correlations. 5 lec., 1 conf.-lab

345. *Medical Physiology 2*. (For medical and a limited number of regular full-time graduate students in the Health Sciences Center's basic sciences department.) 5 HR. PR: PSIO 344 and consent of department chairperson. Continuation of PSIO 344. 5 lec., 1 conf.-lab.

346. *Neurophysiology*. (For graduate students in the Health Sciences Center's basic sciences departments and a limited number of regular full-time graduate students.) II. 1-4 HR. PR: MATH 3 or 141, PHYS. 1 and 2 or consent of department chairperson. Properties of excitable tissues (nerve and muscle), synaptic transmission, reflexes and central nervous system function, and behavior. 1-3 lec., 1 conf.

350. *Graduate Physiology 1.* (For graduate students in the Health Sciences Center's basic sciences departments and a limited number of other regular full-time graduate students.) I 6 HR. PR: Calculus, college physics, organic chemistry, biology, and consent of department chairperson. Analysis of basic facts and concepts relating to cellular processes, organ systems, and their control.

351. *Graduate Physiology 2.* (For graduate students in the Health Sciences Center's basic sciences departments and a limited number of other regular full-time graduate students.) II 6 HR. PR: PHYS 344 or 350 and consent of department chairperson. Continuation of PHYS 350.

399. *Special Topics.* I, II, S. 1-12 HR. PR: Consent. Assigned study to designed to develop research skills.

444. *Graduate Seminar.* I, II. 1-3 HR. PR: Graduate standing and consent. (Graded S/U.)

490. *Teaching Practicum.* I, II. 1-3 HR. PR: Consent. Supervised practices in college teaching of physiology. (Graded as S or U.)

491. *Advanced Physiology.* I, II, S. 1-15 HR. PR: Consent. Lecture-conference in; cellular physiology, neurophysiology, circulation, respiration, acid-base and renal physiology, digestion and energy metabolism, and endocrinology. 3 lec., 3 conf.

497. *Research in Physiology.* I, II, S. 1-15 HR.

498. *Thesis.* I, II, S. 2-4 HR. PR: Consent. (Graded as S or U.)

499. *Graduate Colloquium.* I, II. 1-6 HR. PR: Consent. (Graded as S or U.)

Public Health

Department of Community Medicine Bill Carlton, Ed.D., M.S., Program Director
Alan M. Ducatman, M.D., M.Sc. Department Chair

Masters in Public Health

The MPH Program is an accredited program that prepares students to fill roles where public health decisions are being made, ranging from managed care and other integrated delivery systems, the medical products industry, health departments and other governmental agencies, consumer groups, and community-based organizations.

The program requirements are listed below. Physicians may also apply to the Occupational Medicine Residency Program and may designate the MPH as part of their residency.

The Goals of the MPH Program are:

- To improve the education and professional impact of those entrusted with public health responsibility in West Virginia.
- To improve the cost effectiveness, quality assurance, and competitive position of population-driven health policy decisions in West Virginia.
- To increase the interdisciplinary collaboration and information base for public health decision making, involving numerous different types of personnel for whom the training is appropriate.
- To measure and improve the health status of the population of West Virginia.

Admissions Requirements

Applications are reviewed two (2) times per year (In November for entry spring and Summer semesters and in June for entry fall semester). Requirements include the general test of the Graduate Record Examination (GRE), transcripts, Application for Admission to Graduate Education at WVU (together with check for application fee), MPH program application a typed essay to include the applicants career objective, three letters of reference, and a resume/CV. Applicants should be sincerely interested in public health and improving the well-being of our population. These documents should be forwarded to MPH Program Manager, WVU School of Medicine, PO Box 9145, Morgantown, WV 26506-9145. Full-time and part-time students are admitted.

Performance Standards

Full-time students can complete the program in four (4) semesters including the practicum.

Students are expected to maintain a 3.0 GPA. A faculty review is required if two (2) grades of "C" or lower are recorded. Three (3) grades of "C" or lower will result in academic suspension. Grades lower than "C" will not count toward satisfying graduate degree requirements.

Students should petition for admission to candidacy for the degree by filing a plan of study approved by faculty advisors before completion of 9 credit hours.

Program Requirements

Program requirements include completion of 22 required core courses, 12 hours electives, and 9 hours practicum. The required core courses are:

CMED 301	<i>Introduction to Public Health</i>	3 hr.
CMED 311	<i>Biostatistics</i>	3 hr.
CMED 325	<i>Biology, Society, & Human Health</i>	3 hr.
CMED 340	<i>Perspectives in Public Health</i>	3 hr.
CMED 350	<i>Environmental Health</i>	3 hr.
CMED 360	<i>Public Health Epidemiology</i>	3 hr.
CMED 391A	<i>Behavioral Science in PH</i>	3 hr.
CMED 391B	<i>Policy and the Health System</i>	3 hr.
CMED 496	<i>Seminar</i>	1 hr.
CMED 389	<i>Practicum</i>	9 hr.

Community Medicine (CMED)

301. *Perspectives in Public Health*. I. 3 HR. PR: Consent An introduction to the field of Public Health with an emphasis on the relationship and role of Public Health to other disciplines in resolving public health problems.

311. *Methods of Biostatistics*. 3 HR. PR: Math 3. Basic concepts of statistical models, distributions, probability, random variables, test of hypotheses, confidence intervals, regression, correlation, F and X2 distributions, analysis of cariance with emphasis on methods of biostatistics. (Equiv. to STAT 311.)

312. *Community Medicine*. (Second year.) II. 3 HR. PR: Consent, Medical students only. The role of the physician in the prevention of disease and in the examination of health status in a community, with reference to demographic, economic, sociologic, environmental, and occupational factors. The organization of public health and medical care.

322. *Epidemiology and Biostatistics*. (First year.) II. 2 HR. PR: Consent; medical students only. Epidemiological and statistical analysis of biologic phenomena as related to medicine. Emphasis on descriptive statistics, analytical epidemiology, statistical inference, measures of association, and evaluation of medical literature.

325. *Biology, Society, Human Health*. 3 HR. PR: Consent. This course will cover fundamental biological knowledge about disease development in individuals and populations. The interactions of social and physical environments with physiological, psychological, and emotional characteristics in producing health and disease will be emphasized.

350. *Environmental Health*. 3 HR. PR: Consent. A review of issues illustrating the responsibilities and roles of the public health workplace in identifying, managing, and preventing casualties from environmental causes in air, water, soil, food, pesticides, and related subjects.

360. *Public Health Epidemiology*. 3 HR. PR: Consent or corequisite of CMED 311. Epidemiological study of populations in terms of morbidity, mortality, and other vital statistics in West Virginia. Scientific appraisal of public health problems and analysis of data will be emphasized. Evaluation of current literature is included.

389. *Practicum*. 3-9 HR. PR: Consent. For MPH students only. Under guidance of faculty and field counselors, MPH students will assume major responsibilities for intervention and practice projects during a semester in a community-based organization.

391. *Advanced Topics*. 1-6 HR. PR: Consent.

399. *Critical Review of Literature*. I & II. 1 HR. PR: MD or Consent. A review of current literature in occupational and environmental medicine, focused on analysis of validity and procedures followed; scrutiny of research reports, their design, methodology, data handling, documentation, and discussion of the data base. 1 HR. conf.

412. *Medical Aspects of Environmental Health*. I & II. 1 HR. PR: MD degree or consent. A review of issues illustrating the responsibilities and professional interaction of physicians in identifying, managing, and preventing casualties from environmental causes in air, water, soil, food, pesticides, and related subjects. 1 HR. lec.

491. *Advanced Study*. 1-6 HR. PR: Consent.

492. *Directed Study*. I, II, S. 1-6 HR. Directed study, readings, and research.

493. *Special Topics*. I, II, S. 1-6 HR. A study of contemporary topics selected from recent developments in the field.

494. *Special Seminars*. I, II, S. 1-6 HR. Special seminars arranged for advanced graduate students.

495. *Independent Study*. I, II, S. 1-6 HR. Faculty supervised study of topics not available through regular course offerings.

496. *Graduate Seminar*. 1 HR. PR: Consent.

497. *Research in Occupational Medicine*. I & II. CMED 497. Research in Occupational Medicine. I & II. 1-15 HR. Variable credit. PR: Consent. Exercises in investigational medicine, illustrating the requirements and procedures relevant to the description and quantification of current issues in occupational medical practices. relevant to the description and quantification of current relevant to the description and quantification of current issues in occupational medical practice. Issues in occupational medical practice.

School of Nursing

E. Jane Martin, Ph.D., R.N., F.A.A.N., Dean

Karen E. Miles, Ed.D., R.N., Associate Dean for Academic Affairs

Michelle Janney, Ph.D., R.N., Associate Dean for HSC Clinical Services

Jacqueline W. Riley, M.N., R.N., Assistant Dean for Student & Alumni Affairs

Mona M. Counts, Ph.D., R.N., Chairperson, Department of Health Promotion/Risk Reduction

Lynne Ostrow, Ed.D., R.N., Chairperson, Department of Health Restoration

Patricia S. Simoni, Ed.D., R.N., Chairperson, Department of Health Systems

Cynthia Persily, Ph.D., R.N., Interim Director, Charleston Division

Jacqueline Stemple, Ed.D., R.N., Director, Program Evaluation

The School of Nursing, one of the four professional schools housed at the Health Sciences Center, offers undergraduate and graduate programs of study leading to the B.S.N. and M.S.N. degrees and post-master's nurse practitioner certification in Morgantown, and via satellite television and other advanced telecommunications systems to selected extension sites. The basic B.S.N. program can be completed in four (4) years in Morgantown. Consortium programs with Glenville State College and Potomac State College allow students to complete the first two (2) years at Glenville or Potomac State and the last two (2) years in Morgantown or at West Virginia University Institute of Technology in Montgomery, West Virginia.

The School of Nursing offers a program of study leading to the Master of Science in Nursing (MSN) degree in rural primary health care. The functional areas of study available are advanced practice nursing (Nurse Practitioner), and nursing education. The focal populations are Family Health, Child Health, and Women's Health. Additional subspecialties may become available based on student demand and faculty availability. The school also offers a post-graduate nurse practitioner certification program in the same specialties for those who already have an MSN. The programs are offered at the University main campus in Morgantown and at selected extension sites.

Accreditation

The program is accredited by the appropriate regional and national accrediting agencies.

For further information write: Assistant Dean Student Alumni Affairs, WVU School of Nursing, RCB Health Sciences Center, PO Box 9600, Morgantown, WV 26506-9600.

Faculty

[†] Indicates regular graduate faculty.

^{*} Indicates associate graduate faculty.

June C. Abbey, Ph.D., R.N., F.A.A.N. (U.Cal.-Berkeley). Adjunct Professor.

Shauna Aurelio, M.S.N., R.N. (WVU). Adjunct Instructor.

*Laurie Badzek, M.S.N., J.D., L.L.M., R.N. (WVU). Assistant Professor.

Barbara Banonis, M.S.N., R.N. (WVU). Adjunct Instructor.

Jacquelyn P. Bauer, M.S.N., R.N., N.N.P. (WVU). Adjunct Instructor.

Lucy Jackson-Bayles, Ph.D. M.S. (Ball State). Adjunct Associate Professor.

Maribeth Beckner, M.S.N., R.N., C.O.R.N. (WVU). Adjunct Instructor.

Rosemary Belden, M.S.N., R.N. (U.Va). Adjunct Instructor.

M. Sharon Boni, D.N.Sc., R.N. (Catholic Univ.). Adjunct Associate Professor.

Marjorie Bower, Ed.D., R.N. (WVU). Visiting Assistant Professor.

*Donna D. Brobst, M.S.N., R.N. (U. Wisconsin). Adjunct Instructor.

*Caroline E. Brown, D.Ed., R.N.-C. (Penn. State Univ.). Assistant Professor.

Margaret Burkhardt, Ph.D., R.N. (U. Miami). Associate Professor, Charleston Division.
 Ann Cleveland, M.S.N., R.N. (U. Va.). Lecturer.
 Jill Cochran, M.S.N., R.N. (WVU). Visiting Instructor, Field Professor, Rainelle.
 Susan Collins, M.S.N., R.N. (Duke U.). Adjunct Instructor.
 Sandra Cotton, M.S., C.R.N.P. (U. of Md.). SN Instructor.
 †Mona Counts, Ph.D., R.N.-C., F.A.N.P. (U. Texas). Professor and Chair, Health Promotion/
 Risk Reduction Department.
 Theresa Cowan, M.N., R.N.C.S. (WVU). Instructor and Coordinator, GSC/WVU Joint Nursing
 Program.
 Joan Danner, M.S., R.N., C.S. (U. of Md.). Adjunct Instructor.
 Brenda Daugherty, M.S.N., R.N., N.N.P. (WVU). Adjunct Instructor.
 Daniel DeFeo, M.S.N., R.N., C.C.R.N., F.N.P. (WVU). SN Instructor.
 †Pamela Deiriggi, Ph.D., R.N. (U. Texas). Associate Professor.
 Patricia A. Diehl, M.A., R.N. (WVU). Associate Professor Emerita.
 Rose Ann DiMaria, M.S.N., R.N., C.N.S.N. (Hunter-Bellevue School of Nursing) Lecturer,
 Charleston Division.
 Caroline Jo Dorr, M.S., R.N., C.N.A.A. (Boston Univ.). Adjunct Assistant Professor.
 Mary F. Fanning, M.S.N., R.N.-C., C.C.R.N. (WVU). Visiting Instructor.
 Imogene Foster, Ed.D., R.N. (WVU). Associate Professor.
 Anne Gagnon, M.P.H., R.N. (U. of Pitt.). Lecturer.
 Mary Gibson, M.S.N., C.N.M. (Yale U.). Adjunct Instructor.
 Nancy I. Greenstreet, M.S.N., R.N. (WVU). Adjunct Instructor.
 Suzanne W. Gross, Ph.D., R.N. (U. Texas). Assistant Professor.
 Mary Pat Gruber, M.S.N., R.N. (WVU). Adjunct Instructor.
 Patricia Harman, M.S.N., R.N., C.N.M. (U of Minn.). Adjunct Instructor.
 *Debra Harr, Ed.D., R.N. (WVU). Associate Professor.
 Tracy A. Hessami, M.S.N., R.N., C.N.M. (Yale U.). Adjunct Instructor.
 Cheryl A. Hettman, M.S.N., R.N., C.C.R.N. (W.V.U.). Assistant Professor.
 Diana Higginbotham, M.S., R.N. (W.V.U.). Adjunct Instructor.
 Jean M. Hoff, M.P.H., R.N. (U. Pitt.). Associate Professor Emerita, Interim Director, Nursing
 Department, W.V.U.I.T.
 Patricia Horstman, M.S.N., R.N. (WVU). Adjunct Instructor.
 Michele Zlokas Hubbard, M.S.N., R.N. (WVU). Adjunct Instructor.
 Elizabeth Hupp, M.S.N., R.N. (WVU). Adjunct Instructor.
 Jodie Jackson, M.P.H., R.N. (Johns Hopkins Univ.). Adjunct Instructor.
 *Michelle Janney, Ph.D., R.N. (Univ. of Toledo). Associate Dean for HSC Clinical Services.
 Lorita D. Jenab, Ed.D., R.N. (Columbia U.). Dean Emerita.
 *Dorothy M. Johnson, Ed.D., R.N. (WVU). Assistant Professor.
 Linda Joyce Justice, M.S.N., R.N. (WVU). Adjunct Instructor.
 Judith D. Klingensmith, M.S.N., R.N. (Univ. Of Pitt.). Adjunct Assistant Professor.
 Beverly Knicely, M.S.N., R.N. (WVU). SN Instructor.
 Nancy Koontz, M.S.N., R.N. (U. MD.). Associate Professor Emerita.
 Barbara J. Koster, M.S.N., R.N. (WVU). Adjunct Instructor.
 Grace J. Kreulen, Ph.D., R.N. (U. of Arizona). Assistant Professor.
 *Barbara Kupchak, Ph.D., R.N. (U. Texas). Associate Professor.
 *Susan Leight, Ed.D., R.N. (WVU). Assistant Professor.
 †Nan Leslie, Ph.D., R.N. (U. Pitt.). Associate Professor.
 *Deborah Lewis, Ed.D., R.N.-C.S., C.D.E. (WVU). Assistant Professor.
 Sandra Mullins Marra, Ed.D., R.N., N.C.C. (WVU). Lecturer.
 Kathleen Marsland, M.S., R.N. (U. Colo.). Assistant Professor.
 †E. Jane Martin, Ph.D., R.N., F.A.A.N. (U. Pitt.). Professor and Dean.
 Deborah Maust, M.S.N., R.N. (WVU). Adjunct Instructor.
 Gaynelle McKinney, M.S.N. Ed., R.N., F.A.A.N. (Ind. U.). Professor Emerita.
 †Karen Miles, Ed.D., R.N. (WVU). Associate Professor & Associate Dean for Academic Affairs.
 Anne Slaughter Miller, M.S.N., R.N. (National Univ.). Adjunct Instructor.
 Carol Parsons Miller, M.S.N., R.N. (WVU). Adjunct Instructor.
 Valerie Ann Evans Minor, M.S.N., R.N. (WVU). Adjunct Assistant Professor.
 *Marsha Mitchell, Ed.D., R.N. (WVU). Assistant Professor/ Charleston Division.

Elaine Champion Nailler, M.S.N., R.N., C.S. (Wayne State Univ.). Director of Faculty Practice Plan and Adjunct Instructor.

Cyndy Napoletano, M.S.N., R.N., C.C.R.N. (WVU). Visiting Instructor.

Alvita Nathaniel, M.S.N., R.N. (WVU). Lecturer, Charleston Division.

Mary Nemeth-Pyles, M.S.N., R.N. (WVU). Lecturer, Charleston Division.

Charlotte Nath, E.D., R.N., C.D.E. (WVU). Adjunct Assistant Professor.

Susan Newfield, Ph.D., R.N. (Tex. Tech Univ.). Assistant Professor.

Barbara Jean Nightengale, M.S.N., R.N. (WVU). Adjunct Instructor.

Catherine V. Nolan, Ed.D. (WVU). RWJ Project Coordinator and Lecturer.

Barbara Nunley, M.S.N., R.N. (Ohio St. U.). Instructor, Charleston Division.

Lois O'Kelley, M.S.N., R.N. (Wayne St. U.). Associate Professor Emerita.

Terina Oman, M.S.N., R.N. (WVU). Adjunct Instructor.

*Lynne Ostrow, Ed.D., R.N. (WVU). Associate Professor and Chair, Health Restoration Department.

Mary Ellen Pauley, M.S.N., R.N. (WVU). Lecturer, Charleston Division.

Maria F. Patrick, M.S., R.N. (WVU). Visiting Instructor.

*Cynthia Armstrong Persily, Ph.D., R.N. (U. of Penn.). Associate Professor and Interim Director, Charleston Division.

Drema Pieson, M.S.N., R.N., C.N.A.. (Bellarmine College). Adjunct Instructor.

Judith Polak, M.S.N., R.N., N.N.P. (U. of Fla.). Adjunct Instructor.

Joan Propst, Ed.D., R.N.-C.S. (WVU). Adjunct Associate Professor.

†Beverly C. Richert, Ph.D., R.N. (Univ. of Pitt.). Lecturer.

Jacqueline Riley, M.N., R.N. (U. Fla.). Associate Professor and Assistant Dean for Student & Alumni Affairs.

Susan Ritchie, M.P.H., R.N. (UNC). Adjunct Instructor.

Bonnie Roche, M.S.N., R.N.-C. C.R.N.N. (WVU). Adjunct Instructor.

Sherry L. Rockwell, M.S.N., R.N., C.C.R.N., E.M.T.-P. (Univ. of Pitt.). Adjunct Instructor.

Kari Sand-Jacklin, M.S., R.N. (U. Of Ill.). Adjunct Instructor.

Joanne Seasholtz, Ph.D., R.N. (U. Pitt). Adjunct Assistant Professor.

Jane Shrewsbury, M.N.Ed., R.N. (U. Pitt.). Associate Professor, Emerita.

Debra J. Shupienis, M.S.N., R.N. (WVU). Lecturer, Charleston Division.

†Patricia Simoni, Ed.D., R.N. (WVU). Associate Professor & Chair, Health Systems Department

Priscah Mujuru Simoyi, M.P.H., R.N. (Boston Univ.). Instructor.

*Mary Jane Smith, Ph.D., R.N. (NYU). Professor.

Loreto C. Sobong, Ph.D. (NYU). Research Associate.

Mary Kaye Staggers, M.S.N., R.N. (Wayne State). Visiting Instructor and Coordinator, Potomac State College.

Jacqueline Stemple, Ed.D., R.N. (WVU). Associate Professor and Director of Evaluation.

Fredona Stenger, M.S.N., R.N. (Boston U.). Associate Professor.

Martha Summers, M.S.N., R.N. (WVU). SN Instructor.

Sally M. Taylor, Ed.D., R.N. (WVU). Adjunct Assistant Professor.

Nancy Traubert, M.S.N., R.N. (Ohio State). Adjunct Instructor.

William Wadsworth, Ph.D. (Catholic University). Adjunct Assistant Professor.

†Janet Wang, Ph.D., R.N., F.A.A.N. (U. Pitt.). Associate Professor.

Susan J. Watkins, M.S.N., R.N. (WVU). Adjunct Instructor.

†Joan E. Watson, Ph.D., R.N., F.A.A.N. (Ohio State). Professor.

*Lynne Welch, Ed.D., R.N. (Columbia Univ.). Adjunct Professor and Dean, Marshall University School of Nursing.

Julia Z. White, M.S.N., R.N. (WVU). Adjunct Instructor.

Alison Witte, M.S., R.N. (U. Md.). Visiting Instructor, Glenville.

Jerry H. Yoho, M.S.N., R.N., C.N.A.A. (WVU). Adjunct Instructor.

Alice Ziomek, M.S.N., R.N. (WVU). Visiting Instructor.

Master of Science in Nursing

The graduate program offers a curriculum which allows students to enroll on a part-time or full-time basis. Throughout the curriculum, students are guided in the processes of self-development aimed at pursuing excellence in scholarly and professional endeavors. The program allows flexibility within the basic curricular structure through the individualization of learning experiences, electives, master's paper, thesis, and the opportunity to investigate an area of interest in advanced study.

Study Plan The pattern and duration of the student's study plan is determined in consultation with a faculty advisor and is based upon the student's background and goals. The program can be completed in five semesters, including a summer session, of full-time study at the Morgantown campus. The average full-time load is 9-12 credit hours per semester.

Graduate education in nursing prepares clinicians capable of leadership in developing and expanding nursing knowledge, skills, and practice competencies in light of societal needs. Preparation at the master's level provides the opportunity for the student to demonstrate self-direction and effective interactions with other health professionals in improving nursing practice and the health care delivery system. The master's graduate is able to provide quality health care in a variety of settings while clarifying and redefining nursing roles.

As a part of the University System's commitment to the West Virginia Rural Health Education Partnerships (WVRHEP) program and health care for all West Virginians, all health sciences students in state supported schools are required to complete a rural rotation of at least three months prior to completion of degree requirements. Nursing students will complete this rotation at a designated WVRHEP site during their practicum courses. Every effort will be made to accommodate requests for placement in specific sites, especially sites near a student's home.

Admission Requirements.

These criteria must be met for **regular** admission to graduate study in the School of Nursing. The applicant must:

1. Meet WVU requirements for admission to graduate study.
2. Have a cumulative grade point average of 3.0 or higher on a 4.0 scale on all college work attempted.
3. Have GRE scores within the last 5 years with minimum scores of 400 verbal and analytical and 350 quantitative and totaling 1250 or higher.
4. Have a current, unrestricted RN license in at least one state.
5. Be a BSN graduate of a nationally accredited school.
6. Have completed 3 credits of statistics acceptable for transfer with grade of C or better.
7. Have completed a health assessment course which included physical examination skills with a grade of C or better and acceptable for transfer.
8. Submit three letters of reference.
9. Submit a typewritten statement of professional goals (limited to two (2) typewritten, double-spaced pages). A BSN degree is mandatory. Applicants who do not meet #2 or #3 above, but not both, and who do not meet #6 and/or #7 may be considered for Provisional admission on an individual basis. The specific provisions which must be met for progression to regular status will be noted in the admission letter.

The application process must be completed by June 1 for fall enrollment and October 1 for spring enrollment. Class sizes are limited based on available faculty resources and space.

Progression Standards

In order to progress in the Master of Science in Nursing curriculum, a student is expected to meet the following performance standards:

1. Achieve an overall academic Grade Point Average of at least a 3.0 in all work attempted in the master's program. A student may only carry forward one C grade in a nursing course. A second C in a nursing course will result in dismissal from the program.
2. A student who falls below the 3.0 GPA on nine or more credit hours has one semester to bring up their GPA to the 3.0 requirement.
3. A student may repeat only one nursing course and only one time.

Degree Requirements

- Completion of 44 or 47 semester credit hours, including 34 hours in nursing, and seven hours of cognates specific to the area of concentration.
- Completion of a master's paper (three hours) or thesis (six hours).
- Pass comprehensive examinations.
- Removal of all conditions, deficiencies, and incomplete grades. Credit hours for courses in which the grade is lower than C will not count toward satisfying graduate degree requirements.

Required courses must be taken for letter grades (A, B, C). Electives may be opted for pass (P) or fail (F) grades, subject to the approval of the advisor.

Post Graduate Nurse Practitioner Certificate Program

This program prepares nurses who have an M.S.N. degree as nurse practitioners. The fields of specialization offered are the same as those available in the MSN curriculum. Those who complete the program of study are eligible to sit for the examination for national certification as a nurse practitioner.

Application Requirements To be considered for admission, the applicant must have a master's degree in nursing from an NLN accredited program with a minimum cumulative GPA of 3.0 or better and an unrestricted R.N. license in at least one state.

Certificate Program Requirements Each student's program will be individualized based on their educational and experiential background. Prerequisites to registration for the four required clinical courses are evidence of competence in advanced physiology/pathophysiology, applied therapeutics (pharmacology), and physical examination skills. Competence may be established by transfer of academic credit, enrollment in academic or CEU courses, or challenge examination. The four required courses for post master's certification as a nurse practitioner are: *NSG 336 Clinical Diagnosis across the Lifespan*, *the Speciality cognate*, *Speciality practicum I* and *Speciality practicum II*. In addition, the student must maintain a 3.0 GPA and satisfactory clinical ratings.

Deadlines

The application process for both the master's and post master's program must be completed by **March 1 for summer (May) enrollment; June 1 for fall enrollment and October 1 for spring enrollment**. Class sizes are limited, based on available faculty resources and space.

Application Process

Applicants need to complete the following steps to be considered for admission:

1. Complete two application forms as indicated and return to the appropriate offices to avoid unnecessary delay in the review process.
 - a. An application for Admission to Graduate Studies (available from Admissions and Records) must be returned with a nonrefundable service fee to:
Office of Admissions and Records, West Virginia University, P.O. Box 6009, Morgantown, WV 26506-6009.
 - b. An application for Admission to the Master of Science in Nursing Program (available from School of Nursing Student Alumni Affairs Office) must be returned to: WVU School of Nursing, Student Alumni Affairs Office, PO BOX 9600, Morgantown, WV 26506-9600.
2. Request an official transcript of records from each college or university previously attended. Transcripts and records should be sent directly from the institution to the WVU Office of Admissions and Records, P.O. Box 6009, Morgantown, WV 26506-6009.
3. Send three recommendation letters directly to the Student Alumni Affairs Office, WVU School of Nursing, PO BOX 9600, Morgantown, WV 26506-9600.

Parameters used for the review of applicants include: test scores, academic achievement, professional experience, career goals, and recommendations. When admitted, the student is assigned a faculty advisor who guides the student in curricular and academic matters. Enrollment in nursing courses is based on readiness and availability of space.

M.S.N. Curriculum

M.S.N. Nursing Theory, Practice, and Research (37-40 hours)

NSG 322 <i>Theory/Critical Analysis</i>	3 HR.
NSG 324 <i>Research, Evaluation, and Analysis</i>	5 HR.
NSG 326 <i>Health Policy, Issues, and Ethics</i>	3 HR.
NSG 332 <i>Concepts of Advanced Nursing</i>	2 HR.
NSG 333 <i>Family, Community, Rural Health Systems</i>	2 HR.
NSG 336 <i>Clinical Diagnosis Across the Life Span</i>	3 HR.
NSG 340/50/80 <i>Speciality Course</i>	4 HR.
NSG 341/51/81 <i>Speciality Practicum 1</i>	6 HR.
NSG 342/52/82 <i>Speciality Practicum 2</i>	6 HR.
NSG 397 <i>Research</i> (master's paper-3 credits or Thesis - 6 credits)	3-6 HR.
Subtotal	37-40 HR.
Plus Speciality Requirements	7 HR.
Total	44-47 HR.

Nursing (NSG)

221. *System Responses to Physiological Dysfunction*. I, II. 3 HR. PR: Senior standing in NSG or consent. Conc: NSG 225. Emphasis on professional nursing role in supporting individual/ family/ group responses to acute life threatening situations involving vulnerable populations. Focus is on nursing role in providing care to unstable, individuals/ families/groups.

223. *Seminar 5: Professional Role Development*. I, II. 2 HR. PR: NSG 153 or consent. The professional's role in creating and managing the health care milieu. Focus is on the nurse manager role and interventions in support of the client/ family experiencing acute or long term health problems.

225. *Nursing Interventions 5*. I, II. 6 HR. PR: Senior standing in Nursing or consent. Conc: NSG 221. Professional nursing role in supporting human responses to acute, life-threatening situations involving identified vulnerable populations. Focus is on therapeutic nursing interventions specific to aid human responses of individuals with physiologic instability, and their families.

241. *Community Response to Health Promotion*. I, II. 3 HR. PR: Senior standing in Nursing or consent. Conc: NSG 245. Community Health Nursing processes with emphasis on the professional nursing role in the assessment of community health needs and identification of health action potential.

243. *Seminar 6 : Professional Role Development*. I, II. 2 HR. PR: NSG 223 or consent. Emphasis on professional nursing role in health promotion/and disease prevention in groups/communities of vulnerable populations. Focus is on multidisciplinary team approaches to problem solving in community health.

245. *Nursing Interventions 6*. I, II. 6 HR. PR: Senior standing in NSG or consent. Emphasis is on the collaborative role of the nurse in assisting communities to develop and implement plans for health promotion/risk reduction across the life span. Focus is on vulnerable populations.

276. *Introduction to Nursing Research*. I, II, S. 3 HR. PR: STAT 101 or consent. Theory, concepts and methods of the research process intended to provide a basic understanding that is necessary for intelligent consumership of research findings.

291. *Special Topics*. I, II, S. 1-6 HR. Investigation of topics not covered in regularly scheduled courses.

322. *Theory and Critical Analysis*. I. S. 3 HR. Introduction to the theoretical foundations of the discipline of nursing as a basis for applying critical thinking skills to the development of a conceptual framework for nursing.

324. *Research, Evaluation and Analysis*. II. 5 HR. PR: NSG 322. An overview of research, measurement, and evaluation models useful to nursing practice.

326. *Health Policy: Issues and Ethics*. 3 HR. PR: NSG 322 or Consent. A focus on the social, political, technological, ethical and economical dynamics that shape health care delivery.

332. *Concepts of Advanced Nursing*. I. S. 2 HR. PR: NSG 322 Exploration and evaluation of theories and research in leadership, education, organization, and management concepts applicable in the advanced practice of nursing.

333. *Family, Community, Rural Health Systems*. II. 2 HR. PR: NSG 322. Exploration and analysis of theories and research on family, community, and rural health systems applicable in the advanced practice of nursing.

336. *Clinical Diagnosis Across the Lifespan*. I, S. 3 HR. PR: NSG 322. Introduction to the knowledge and skills basic to the assessment of health status, diagnosis, treatment, and evaluation in the advanced practice of nursing.

340. *Specialty Course Women's Health*. I. 4 HR. PR: NSG 336. Application of the theoretical foundations of advanced practice nursing in the care of women in rural settings; management of care for prevention, intervention, and evaluation.

341. *Women's Health Practicum 1*. I. 6 HR. PR: Conc.; NSG 340. Implementation of theory-based nursing practice with women in rural community system; student development of advanced practice role in managing, consulting, and caring for women.

342. *Women's Health Practicum 2*. I, II, S. 6 HR. PR: NSG 341. Supervised clinical experience under the direction of an advanced practice nurse faculty in the delivery of primary health care to women in rural areas.

350. *Specialty Course: Child Health*. I. 4 HR. PR: NSG 336. Application of the theoretical foundations of advanced practice nursing in child health; Management of care for prevention, intervention, and evaluation.

351. *Child Health Practicum 1*. I, II. 6 HR. PR: Conc. and NSG 350. Implementation of theory-based nursing practice with children in rural community systems; student's development in the advanced practice role in managing, consulting, and caring for children.

352. *Child Health Practicum 2*. S. 6 HR. PR: NSG 351. Supervised clinical experience under the direction of an advanced practice nurse faculty in the delivery of primary health care to children in rural areas.

380. *Specialty Course, Rural Family Health*. I. 4 HR. PR: NSG 336. Application of the theoretical foundations of advanced practice nursing in rural family health care; management of care for prevention, intervention, and evaluation.

381. *Rural Family Health Practicum 1*. I. 6 HR. PR: Conc. NSG 380. Implementation of theory based advanced nursing practice with individuals, families, and groups in the rural community systems; student development of the advanced practice role in managing, consulting, and caring for families.

382. *Rural Family Health: Practicum 2*. II, S. 6 HR. PR: NSG 381. Supervised Clinical experience under the direction of an advanced practice nurse faculty in the delivery of primary health care to individuals, families, and groups in rural areas.

391. *Advanced Study*. I, II, S. 1-6 HR. PR: Graduate standing; consent. In depth study of topics related to current issues in primary health care. Study may be independent or through specially scheduled seminars.

397. *Research*. I, II, S. 1-15 HR. PR: NSG 373; PR or Conc: NSG 378. Refinement and implementation of research proposal to meet requirements for a master's paper.

491. *Advanced Study*. I, II, S. 1-3 HR. PR: Consent. Post master's standing. Investigation in advanced subjects which are not covered in regularly scheduled courses. Study may be independent or through specially scheduled lectures.

492. *Directed Study*. 1-6 HR.

493. *Special Topics*. 1-6 HR.

494. *Special Seminars*. 1-6 HR.

495. *Independent Study*. 1-6 HR.

496. *Graduate Seminar*. 1 HR.

497. *Research*. I, II, S. 1-15. PR: Consent. Post master's standing.

498. *Thesis*. 2-4 HR.

499. *Graduate Colloquium*. 1-6 HR.

School of Pharmacy

George R. Spratto, Ph.D., Dean

Carl J. Malanga, Ph.D., Associate Dean for Academic Affairs

Patrick S. Callery, Ph.D., Assistant Dean for Research and Graduate Programs

The WVU School of Pharmacy offers graduate programs in the pharmaceutical sciences for both the M.S. and Ph.D degrees. It is advantageously located in the Health Sciences Center complex which also houses all departments of the schools of Medicine, Nursing, and Dentistry, as well as a comprehensive medical library, audio-visual and computer-based learning center, photo-illustration service, and laboratory animal quarters. The School of Pharmacy maintains its own research laboratories and equipment on three floors within a section of the Health Sciences Center complex. The scientific community, which is especially well developed, draws on area scientists at WVU, NIOSH, NASA, FBI, and a variety of research centers supported by NSF and the Department of Energy. A new NIOSH research facility is two blocks away and Mylan Pharmaceuticals, the largest generic drug producer in the country, is located across the street from the Health Sciences Center campus.

Applicants for the Ph.D. may choose among several specialty areas, which include medicinal chemistry, pharmaceuticals, biopharmaceuticals/pharmacokinetics, and behavioral/administrative pharmacy. The pharmaceutical sciences uniquely encompass a wide variety of interrelated areas of science and technology. For example, students in medicinal chemistry are trained to combine knowledge in analytic/synthetic chemistry, biochemistry, pharmacology, pharmacokinetics, and toxicology in the design and synthesis of new drugs; those who specialize in pharmaceuticals, biopharmaceuticals, and pharmacokinetics are trained to combine physicochemical methods, cellular and molecular biology, and drug metabolism in the design and evaluation of novel drug delivery systems and their impact on pharmacodynamic and therapeutic effects; and those who specialize in behavioral/administrative pharmacy may integrate sociology, marketing, economics, health care policy administration, public health, etc., or may develop optimal methods in the delivery of pharmaceutical and health services.

Master of Science and Doctor of Philosophy

Students must possess a baccalaureate degree from a suitable academic discipline with an overall grade-point average of at least 2.75 and an aptitude and interest for graduate work in the pharmaceutical sciences. Furthermore, GRE scores in the verbal, quantitative, and analytical sections are required. TOEFL scores may be required of international students.

To obtain specific information related to the school's graduate programs, graduate faculty research interests, and availability of graduate assistantships or fellowships, applicants may write directly to: Assistant Dean for Research and Graduate Programs, WVU School of Pharmacy, Health Sciences Center North, P.O. Box 9500 Morgantown, WV 26506. Telephone: (304) 293-1482. E-mail: pcallery@hsc.wvu.edu, Website: <http://www.hsc.wvu.edu/sop>

School of Pharmacy Graduate Programs

Pharmaceutical Sciences M.S., Ph.D.

Graduate Faculty in Pharmaceutical Sciences

* Indicates associate membership in the graduate faculty.

Professors

Marie A. Abate, Pharm.D. (U. Mich.). Drug information, Computer assisted instruction, Study design and evaluation.

*Calvin C. Brister, Ph.D. (U. Miss.). Biopharmacy.

Patrick S. Callery, Ph.D. (UCSF). Drug design, Drug metabolism.

Arthur I. Jacknowitz, Pharm.D. (Phila. C. Pharm.). Drug information systems.

David Lalka, Ph.D. (SUNY-Buffalo). Pharmacokinetics, Biochemical pharmacology.

Joseph H.K. Ma, Ph.D. (Duquesne U.). Pharmaceutics and pharmaceutical chemistry; Molecular and cellular approaches to targeted drug delivery.

Carl J. Malanga, Ph.D. (Fordham U.). Biopharmacy, Pharmacology and physiology of mucociliary transport.

Sidney A. Rosenbluth, Ph.D. (U. Tex.). Development and evaluation of expanded pharmacists' roles in health care delivery, Disease prevention/health promotion.

Xianglin Shi, Ph.D. (WVU). Free radical chemistry and biology.

George R. Spratto, Ph.D. (U. Minn.). Dean. Pharmacology.

Associate Professors

Peter M. Gannett, Ph.D. (U. Wisc.). Metabolism and carcinogenesis of alkyl hydrazines.

Robert K. Griffith, Ph.D. (Ohio St. U.). Drug design, Medicinal chemistry.

Sundareswaran (Suresh) Madhavan, Ph.D. (Purdue U.). Health care and pharmaceutical marketing, Health services research, Pharmaceutical cost-containment.

Yongyut Rojanasakul, Ph.D. (U. Wisc.). Pharmaceutics, Drug delivery and transport phenomena in biological systems; antisense oligonucleotides.

Mohamadi Sarkar, Ph.D. (MCV). Pharmaceutics.

Paula Jo Meyer Stout, Ph.D. (WVU). Pharmaceutics, Industrial pharmacy/product formulation.

Assistant Professors

*K. Ann Berry (U. Houston). Pharmacokinetics, Toxicokinetics.

*Mei-Ying Huang (Ohio State U.). Pharmacokinetics, population kinetics.

*W. Greg Leader, Pharm. D. (U. Ky). Applied pharmacokinetics; extrahepatic metabolism; adult pulmonary medicine.

David P. Nau (U. FL). Outcomes assessment and quality improvement research.

*David Toledo-Velasquez (U. Wisconsin). Pharmaceutics, Targeted drug delivery systems.

Ginger G. Scott (U. MN). Pharmacy practice and health services research.

Timothy Tracy, Ph.D. (Purdue U.). Clinical pharmacology; Drug metabolism.

Pharmaceutical Sciences

Patrick S. Callery, Assistant Dean for Research and Graduate Programs
1136 Health Sciences North

Degrees Offered: Master of Science, Doctor of Philosophy

The School of Pharmacy offers graduate programs in the basic pharmaceutical sciences and in behavioral and administrative pharmacy, leading to the degrees of master of science and doctor of philosophy. These research-oriented programs are sufficiently flexible to accommodate individual interests, capabilities, and potential of the student for maximum academic development in becoming an accomplished research scholar and teacher. For general admission, applicants must satisfy the requirements for all graduate students entering WVU. For admission with regular student status, the applicant must possess a baccalaureate degree in a suitable academic area, an overall grade-point average of at least 2.75, and an aptitude and interest for graduate work in the pharmaceutical sciences. Applicants not admitted with regular student status may be considered for alternative admission status. Graduate Record Examination scores

in the verbal, quantitative, and analytical portions of the examination are required of all students, and TOEFL, or similar scores, are additionally required of international applicants. For applicants in the area of behavioral and administrative pharmacy, test scores on the Graduate Management Admissions Test (GMAT) are acceptable, although GRE scores are preferred.

No course credits with a grade of less than C may be counted toward fulfilling credit-hour requirements for a graduate degree. Furthermore, a cumulative grade-point average of no less than 3.0 in all graduate courses must be obtained by the student to qualify for an advanced degree.

Master of Science

Students admitted for the master of science (M.S.) may specialize in behavioral and administrative pharmacy, medicinal chemistry, pharmaceuticals, biopharmaceutics, and pharmacokinetics.

To be eligible for the M.S. degree, students must complete a minimum of 30 hours of graduate credit, of which no more than six hours may be for research and thesis.

Upon completion of course work and research requirements, and after submission of the thesis, an oral examination for the thesis defense will be administered by the student's advisory committee.

Doctor of Philosophy

Students admitted for the doctor of philosophy (Ph.D.) degree program may choose among several specialty areas, which include medicinal chemistry, pharmaceuticals, biopharmaceutics/pharmacokinetics, and behavioral and administrative pharmacy.

Course Work The student's first semester is usually occupied with course work while under the guidance of the assistant dean for research and graduate programs. During this period, a student will confer with faculty members in the student's area of interest concerning a possible research project, and a major professor should be chosen by the end of the first semester of graduate study. Prior to the third semester for M.S. students or the fourth semester for Ph.D. students in the program, under the direction of the agreed upon research advisor, the student shall have completed the process of selecting members of their masters thesis (minimum of 3) or doctoral dissertation (minimum of 5) research committee.

The interest to pursue the M.S. degree en route to the Ph.D. should also be stated at this time. Students must complete all requirements for the M.S. degree except the preparation and defense of the thesis in order to advance in the Ph.D. program. With committee advice, the student, however, may elect to prepare and defend a thesis to obtain the M.S. before the Ph.D.

Study Plan A formal plan of study must be submitted by the student upon completion of 30 credit-hours (or 18 credit-hours for the M.S.) of formal graduate course work. With guidance from the research advisory committee and by the end of the second year in the program, the student should have completed the language/research tool requirements.

Candidacy To be admitted for candidacy of the Ph.D. degree, the student must satisfy the above requirements and pass oral and written qualifying examinations. After admission to candidacy for the Ph.D., a student normally devotes substantial time to an original research project that culminates in a dissertation. The dissertation must be satisfactorily completed and defended at an oral examination before the recommendation to award the Ph.D.

Pharmacy (PHAR)

301. *Advanced Biopharmaceutics*. I or II. 3 HR. Concepts of biopharmaceutics and pharmacokinetics in relation to the design and evaluation of dosage forms and determination of rational dosage regimens in health and disease.

302. *Advanced Pharmaceutics*. I or II. 3 HR. Physicochemical and biopharmaceutical principles involved in disperse systems (liquid, semi-solid, and solid) which function as dosage forms. Considerations of properties of solid dispersions, micromeritics, diffusion of liquid dispersions, interfacial phenomena, emulsification, suspensions, prolonged action medication, etc.

323. *Economics of the Pharmaceutical Industry*. I or II. 3 HR. History, background, and formation of major drug industries. Oligopolistic practices, mergers, combines, costs of research, and production.

375. *Advanced Pharmaceutical Analysis 1*. I or II. 3 HR. Spectroscopic and chromatographic methods of analysis with emphasis on their applications in pharmaceutical problems and in biological sciences.

390. *Special Topics*. I, II, S. 1-4 HR.

391. *Seminar in Pharmaceutical Sciences*. I, II. 1-6 HR. PR: Consent. A multidisciplinary weekly presentation and discussion of special topics and research in the pharmaceutical sciences. (Weekly attendance is required and grading is on an S/U basis only.)

396. *Special Problems in Pharmaceutical Sciences*. I, II. S. 1-3 HR. Where special interest is shown by the student in an area other than of the student's thesis research, a faculty member will supervise individual study and research.

397. *Research*. 1-15 HR.

484. *Special Seminar*. I, II, S. 1-6 HR. For use by disciplines in the pharmaceutical sciences wishing to have graduate students and faculty participate in seminars and group discussions on specialized or technical topics at the advanced level.

490. *Teaching Practicum*. I, II. 1-3 HR. PR: Graduate standing and consent. Supervised practices in college teaching of pharmacy.

491. *Advanced Study*. I, II, S. 1-6. PR: Consent. Investigation in advanced subjects which are not covered in regularly scheduled courses. Study may be independent or through specially scheduled lectures.

492. *Directed Study*. 1-6 HR.

493. *Special Topics*. 1-6 HR.

494. *Special Seminars*. 1-6 HR.

495. *Independent Study*. 1-6 HR.

496. *Graduate Seminar*. I, II. 1 HR. PR: Consent. Formal presentation by graduate students to assembled graduate faculty and students of research or special topics approved by advisor. Title to be presented at start of semester. Required at least once annually. (Grading is S/U.)

497. *Research*. I, II. 1-15 HR.

498. *Thesis*. I, II, S. 2-4 HR. PR: Consent.

499. *Graduate Colloquium*. 1-6 HR.

School of Physical Education

Dana D. Brooks, Ed.D., Dean

Lynn Housner, Ph.D., Assistant Dean

Dallas Branch, Jr., Ph.D., Coordinator, Sport Management

Betsy Schmidt, M.Ed., Interim Coordinator, Athletic Training

Andrew Ostrow, Ph.D., Coordinator, Sport Behavior

Robert L. Wiegand, Ed.D., Coordinator, Teacher Education

Rachel Yeater, Ph.D., Coordinator, Exercise Physiology

Daniel Ziatz, Ph.D., Coordinator, Athletic Coaching Education

Andrew H. Hawkins, Ed.D., Graduate Program Coordinator

The School of Physical Education is organized into five programs: athletic coaching, athletic training, sport behavior, sport management, and teacher education.

The doctoral program administered through the School of Physical Education has three majors areas: sport behavior, teacher education, and exercise physiology. (For program description of the last, see exercise physiology in the School of Medicine.) The School's master's program allows specialization in teacher preparation, athletic training, athletic coaching education, sport behavior, and sport management leading to a master of science in physical education.

The facilities of the School of Physical Education include the gymnasium, dance studio, and swimming pool in E. Moore Hall; a gymnasium in Stansbury Hall; bowling lanes in the Mountainlair; indoor track, sports area, weight training room, martial arts room, and rifle range in the Shell Building; outdoor areas include the stadium, tennis courts, archery range, soccer and field hockey fields, and outdoor track; and the Natatorium with its pool and diving well.

The Coliseum contains the Ray O. Duncan Reading Room, classrooms and seminar rooms, faculty offices, a large gymnasium, a dance studio, racquetball and squash courts, and sport behavior laboratory. Additional faculty and staff offices are in E. Moore Hall, Stansbury Hall, the Natatorium, and the Shell Building.

For additional information, please contact the Graduate Coordinator, School of Physical Education, 210 Coliseum, P.O. Box 6116, West Virginia University, Morgantown, WV 26506-6116. Telephone (304) 293-3295 x 210.

Graduate Degrees in Physical Education

Physical Education M.S., Ed.D.

Graduate Faculty

[†]Indicates regular membership in the graduate faculty.

* Indicates associate membership in the graduate faculty.

Professors

Carl P. Bahneman, Ph.D. (U. Pitt). Teacher behavior, Administration.

[†]Dana D. Brooks, Ed.D. (WVU). Dean. African American sport, Social/psychological aspects of sport, Youth sport.

*J. William Douglas, Ph.D. (Ohio U.). Management theory, History and philosophy of sport.

[†]Andrew H. Hawkins, Ph.D. (Ohio St. U.). Graduate coordinator. Teacher education.

[†]Lynn Houser, Ph.D. (U.P.H.). Assistant Dean. Teacher preparation.

[†]Andrew C. Ostrow, Ph.D. (U.C.-Berkeley). Program coordinator, Sport Behavior.

Physical activity and aging, Psychological assessment

[†]Robert L. Wiegand, Ed.D. (U. Ga.). Program coordinator, Physical Education/Teacher Education, Curriculum.

Associate Professors

*William L. Alsop, Ed.D. (WVU). Sport studies, Sport management.

Linda Carson, Ed.D. (WVU). Motor Development.

*Floyd Jones, Ph.D. (U. Pitt.). Pedagogy cognitions, At-risk preadolescents and summertime learning deficiencies.

Bruce Wilmoth, M.S. (Brigham Young U). Teacher preparation.

*Daniel Ziatz, Ph.D. (U. Utah). Pedagogy, Athletic coaching education, Wellness/Fitness.

Assistant Professors

*Dallas D. Branch, Jr., Ph.D. (Ohio U.). Program coordinator, Sport Management. Sport management, Sport marketing.

Linda Burdette, M.S. (WVU). Teacher preparation.

*Edward Etzel, Ed.D. (WVU). Sport psychology, Performance enhancement, Counseling athletes, Psychological aspects of injury.

John C. McGrath, M.S. (Bemidji St. Co.). Teacher preparation.

*Frank Perna, Ed.D. (Boston U.). Health psychology, Performance enhancement, Athletic career transition.

*Vincent Stilger, H.S.D. (Ind. U.). Undergraduate Coordinator, Athletic Training.

*Laura Treanor, Ed.D. (VPI). Teacher preparation, Student teacher, Pedagogical kinesiology.

*Sandra K. Vanin, Ed.D. (WVU). Teacher preparation, Adapted physical education, Wellness/fitness programs for adults with special needs.

Program

Graduate studies in physical education leading to a doctor of education are available in three major areas: sport behavior, teacher education, and exercise physiology. The following are admission criteria for students to be admitted with regular status to the Ed.D. in those areas.

Application Deadline

Application procedures must be completed by March 1 for the M.S. or Ed.D. programs of the year in which the applicant intends to begin their program. The application for graduate school, official transcript(s), and application fee must be submitted to the Office of Admissions and Records. Upon receipt of the application, transcripts, and above admission criteria, the student's credentials are reviewed by an appropriate screening committee. Students who seek a graduate assistantship should apply by March 1. Information and applications for graduate teaching and research assistantships can be obtained from Carol Straight, School of Physical Education, Records Office, P.O. Box 6116, Morgantown, WV 26506-6116.

Doctor of Education

Admission Criteria

- Undergraduate grade-point average of 3.0 from an approved institution.
- Master's degree grade-point average of 3.0 from an approved institution (3.5 minimum for Sport Behavior).
- Minimum Graduate Record Examination score of 1000 (verbal/quantitative) or 1500 (verbal/quantitative/analytical); 1050 (verbal/quantitative) for sport behavior; or Miller Analogies Test score of 55.
- TOEFL score of 550 (international applicants).
- Three letters of reference.
- Writing sample (two- to three-page) summary of your professional background, professional aspirations, research experience (sport behavior).

Doctoral Committee and Examination Once the student is admitted to the program, the student—in concert with the advisor—selects a doctoral committee. It is this committee's responsibility to aid the student in planning the total program. During the process of completing the program, the student is expected to fulfill a residency requirement specified by the committee.

As the student completes the course work, application can be made to complete the final comprehensive examination. This examination consists of scholarly tasks designed to function as a comprehensive learning experience. The examination will be constructed by the student's doctoral committee. Students who do not successfully complete this examination may be permitted to attempt the examination one more time pending an appeal and subsequent sanction of the student's doctoral committee. There must be a time period of at least six months between the first and second examinations.

Candidacy Upon successful completion of the final comprehensive examination, the student may present to the doctoral committee a prospectus of the dissertation. If the opinion of the committee is such that the student may proceed with the dissertation, the student is admitted to candidacy.

Oral Defense Upon the completion of the dissertation, the candidate will appear before the doctoral committee for purposes of orally defending the study. Successful defense of the dissertation results in the awarding of the degree. All requirements must be completed within five years after admission to candidacy.

Master of Science Admission Criteria

- Undergraduate grade-point average of 2.75 for regular status (3.0 minimum grade-point average for sport behavior major).
- Graduate Record Examination score of 1000 (verbal/quantitative) or Miller Analogies Test score of 50. (Sport Behavior and Sport Management only).
- TOEFL score of 550 (international applicants).
- Three letters of reference.
- Personal interview (when possible).
- One- to two-page statement on background and professional goals (sport behavior).
- Resume and two-page autobiography (sport management).

Athletic Coaching Education

This major is designed to develop the skills and knowledge necessary to be an athletic coach. The medical, legal, growth and developmental, psychosocial, biophysical, and technical aspects of coaching are emphasized.

Athletic Training

Completion of the M.S. program with NATA certification permits the graduate to pursue a wide range of employment at the secondary, collegiate, professional, clinical, or corporate levels. The graduate major in athletic training offers the following:

- One-year program
- Two-year program
- West Virginia state certification

All of the above programs include clinical experience.

Both the one-year and the two-year programs are designed for individuals who are NATA certified or certification eligible. Courses are intended to augment the student's academic background and further enhance clinical skills. All applicants must comply with WVU requirements for graduate study and the requirements of the athletic training program.

The West Virginia state certification program is designed for teachers already holding a professional endorsement in a major field. Students must complete a core of courses at the graduate level, complete required undergraduate courses, and make application to the WV Department of Education for certification. This program requires a minimum of 37 credit hours. Certification enables teachers to work as a *state certified* athletic trainer in WV public schools.

Sport Behavior

Students admitted into the sport behavior major may select either the 36 credit hour thesis option or the 48 credit hour internship option.

Sport Management

The sport management major requires 39 credit hours, including a six hour internship. Applicants must send all application materials to the program coordinator by March 1. The selection process for the 15 applicants who are accepted into the program is conducted during the spring semester. A personal interview is a part of the selection process. Applicants will be notified of their selection by May 1.

Teacher Education

Students are admitted to physical education/teacher education for work leading to the master of science degree if they hold a baccalaureate degree from an approved institution of higher education, are certified or certifiable to teach physical education in the public schools, have a 2.75 undergraduate grade-point average, and satisfy prerequisites in the courses for which they register. The physical education/teacher education program requires one year of study and field experience.

Provisional Admission

Students who do not meet the 2.75 grade-point average requirement are admitted as provisional graduate students if their GPA is above 2.50; they are required to attain a 3.0 grade-point average in the first 12 hours of advisor-approved course work in order to be reclassified as a regular graduate student. In order to receive the degree, the student must have a minimum average of 3.0 in all course work leading toward the degree and satisfy all department and University requirements.

Athletic Training (ATTR)

201. *Athletic Training Practicum 3*. I. 2 HR. PR: Junior standing and consent. Structured methods of practical application and evaluation of clinical skills and academic knowledge of athletic training students and their progress through the athletic training program.

202. *Athletic Training Practicum 4*. II. 2 HR. PR: Junior standing and consent. Structured methods of practical application and evaluation of clinical skills and academic knowledge of athletic training students and their progress through the athletic training program.

203. *Athletic Training Practicum 5*. I. 2 HR. PR: Senior standing and consent. Structured methods of practical application and evaluation of clinical skills and academic knowledge of athletic training students and their progress through the athletic training program.

204. *Athletic Training Practicum 6*. II. 2 HR. PR: Senior standing and consent. Structured methods of practical application and evaluation of clinical skills and academic knowledge of athletic training students and their progress through the athletic training program.

218. *Gross Anatomy Lab*. II. 1 HR. Analysis of gross anatomy and systems of the trunk and extremities; cadaver laboratory experience.

219. *Gross Anatomy*. II, S. 3 HR. Designed to provide an overview of body systems and gross anatomy of the trunk and extremities.

220. *Advanced Athletic Training*. S. 3 HR. PR: Consent. Designed to provide an in-depth analysis of life-threatening situations and internal injuries associated with athletics.

221. *Therapeutic Modalities*. I, II. 3 HR. PR: Consent. Designed to investigate tissue repair, physiology of hot and cold treatment, therapeutic modalities and pharmacology relevant to athletic injury management.

222. *Orthopedic Assessment 1*. II. 3 HR. PR: Consent. Designed to provide in-depth analysis of athletic injury mechanisms; injury evaluation techniques and rehabilitation; and muscle isolation techniques.

223. *Athletic Injury Rehabilitation*. I. 3 HR. PR: Consent. Designed for the practical applications of athletic training techniques.

224. *Athletic Training Senior Seminar*. I. 3 HR. PR: Consent. Practical application of athletic training techniques.

225. *Organization & Administration*. II. 3 HR. PR: Consent. Designed to analyze various issues and policies in athletic training relevant to training room administration, liability, drug testing, record keeping, and other selected topics.

226. *Medical Aspects of Athletic Training*. I. 3 HR. PR: Consent. Designed to provide students the exposure to a variety of medical concerns, illnesses, and conditions that may occur within the various clinical settings of athletic training.

227. *Biomechanics*. II. 3 HR. PR: Consent. Designed to provide in-depth study of normal and abnormal biomechanics of the lower extremity and spine

232. *Orthopedic Assessment 2*. S. 3 HR. PR: Consent. Designed to provide in-depth analysis of athletic injury mechanics to the upper extremity; injury recognition, injury evaluation techniques, and muscle isolation techniques.

318. *Anatomy Laboratory*. S. 3 HR. PR: ATTR 219 or equivalent. Cadaver laboratory experience involving an anatomical analysis of the trunk and extremities.

323. *Athletic Training Practicum*. I, II, S. 1-6 HR. PR: Consent. Designed to provide experience in various practical situations in athletic training and other related areas.

325. *Advanced Rehabilitation Techniques*. II. 3 HR. PR: ATTR 340 or equivalent. Students will gain an understanding of the current rehabilitation protocols and will become proficient in various techniques involving manual therapy and isokinetics devices.

340. *Advanced Orthopedic Assessment*. II. 3 HR. PR: ATTR 222 or equivalent. Students will learn additional assessment techniques, enabling them to further refine their injury evaluation skills.

350. *Medical/Surgical Aspects of Athletic Training*. I. 3 HR. Variety of current medical and surgical procedures commonly performed on athletic populations.

391. *Advanced Topics*. I, II, S. 1-6 HR.

397. *Research*. I, II. 1-6 HR. PR: SS 315 or equivalent. Research project to include review of current literature, collect data, results, conclusions, and bibliography.

Physical Education Teacher Education (PET)

300. *Workshop in Physical Education*. I, II, S. 1-15 HR.

305. *Professional Issues in Physical Education*. S. 3 HR. PR: Completion of 24 graduate hours or consent. Designed to examine current professional issues in physical education and the impact of these issues on the professional's life.

315. *Research Methodology in Physical Education*. I, S. 3 HR. PR: Graduate standing or consent. Application of historical, descriptive, and experimental research strategies and designs to physical education.

336. *Instructional Methods for Physical Education*. I, S. 3 HR. PR: PET 315 or consent. Designed to provide physical educators with the methodological skill necessary to comply with Public Law 94-142 (Education for All Handicapped Children Act). The research justification for the methodological approaches examined will be emphasized.

338. *Operant Principles for Physical Education*. II, S. 3 HR. PR: PET 315 or consent. Designed for the use and evaluation of operant principles in the development and control of motor behavior in physical education. Applications will be made to traditional group and individually prescribed instructional systems in physical education.

344. *Pedagogical Kinesiology*. I, S. 3 HR. Qualitative analysis of fundamental motor skills and sport-specific performances; discussion of research, application of self-directed experiments, and presentations of selected research papers. (Offered fall and every third summer.)

346. *Curriculum in Physical Education*. I, S. 3 HR. PR: PET 315 or consent. Designed to examine the factors affecting curriculum development. Emphasis on research in the changing curriculum, and the selection and sequencing of developmentally appropriate activities for early, middle, and adolescent childhood.

366. *Motor Development*. I, S. 3 HR. PR: PET 315 or consent. Designed to examine developmental motor skill acquisition across the entire life span. Hereditary and environmental factors unique to the motor-skill development of the maturing individual will be emphasized.

368. *Infant/Early Childhood Motor Development*. II, S. 3 HR. PR: PET 315, PET 366 or consent. Examination of motor development during infancy and early childhood focusing on physical education's interactive role with the developmental process. Emphasizing current developmental research related to the area.

370. *Middle Childhood/Adolescent Motor Development*. II, S. 3 HR. PR: PET 315, PET 366 or consent. Examination of motor development during middle childhood and adolescence focusing on physical education's interactive role with the developmental process. Emphasizes current developmental research related to the area.

371. *Motor Development in Special Populations*. II, S. 3 HR. PR: PET 315, PET 366 or consent. Designed to examine the motor developmental patterns of various special population groups focusing on physical education's interactive role with the developmental process. Current developmental research related to the area will be emphasized. (Offered every third summer.)

381. *Principles of Effective Teaching*. S. 3 HR. Research based principles of effective teaching as they relate to physical education. Students will examine and evaluate their own teaching practices through a series of reflective assignments.

383. *Physical Education Supervision Tech*. S. 3 HR. Effective supervision practices for the perspective physical education directing teacher.

385. *Master Teacher Practicum*. I, II, S. 3 HR. PR: PET 336, PET 338, PET 346 and PET 366. Application of a wide range of prerequisite course competencies in an actual physical education class for which the student has complete instructional responsibility. Self-evaluation skills of the master teacher candidate are emphasized.

391. *Advanced Topics*. I, II, S. 1-6 HR.

397. *Research/Thesis*. I, II, S. 1-15 HR.

446. *Advanced Measurement in Physical Education*. II, S. 3 HR. PR: PET 315. Designed to extend and apply the basic concepts of measurements and statistical evaluation to physical education.

460. *Management Processes in Physical Education*. II. 3 HR. PR: Graduate standing or consent. Designed to explore analytically the situational, relational processes between the administrator of physical education school programs and the teacher of physical education, the physical education facility, and the physical education planned learning environment.

465. *Professional Physical Education Resource Seminar*. I. 3 HR. PR: Graduate standing. (Required for all doctoral students.) Designed as an introductory seminar for doctoral professional physical educators. Discussion, debate, and position statements on critical issues facing the physical education profession.

480. *Dissertation/Thesis Seminar*. II. 3 HR. PR: Graduate standing and PET 315. (Required for all doctoral students.) Designed to critically analyze the graduate student's dissertation or research proposal.

490. *Teaching Practicum*. I, II, S. 1-3 HR.

491. *Advanced Study*. I, II, S. 1-6 HR.

492. *Special Seminars*. I, II, S. 1-6 HR.

493. *Special Seminars*. I, II, S. 1-6 HR.

494. *Special Seminars*. I, II, S. 1-6 HR.

495. *Special Seminars*. I, II, S. 1-6 HR.

496. *Graduate Seminar*. I, II, S. 1-6 HR.

497. *Research*. I, II, S. 1-15 HR.

498. *Dissertation*. I, II, S. 2 - 4 HR.

499. *Colloquium*. I, II, S. 1-6 HR.

Sport Studies (SS)

225. *Facility Planning*. II. 3 HR. PR: Consent. An in-depth study of sport facilities, including planning, design, liability and facility management concepts and evaluation.

226. *Liability in Sport*. I. 3 HR. An overview of the legal system as it applies to sport, including contracts, tort law, drug testing, rights of athletes, product liability, legal duties of coaches, facilities supervisors, and athletic directors.

227. *Legal Issues in Sport Administration*. II. 3 HR. PR: Sport Management Majors Only. The NCAA, its rules, and its regulations: In-depth study of professional sport leagues, their constitution, by-laws, regulations, collective bargaining agreements, standard player contracts; legal issues involving sport agents.

310. *Sport Broadcasting*. I. 3 HR. PR: Graduate standing or consent. The collegiate and professional sport environment in radio and television; elements of radio/television production; ratings and marketing/sales techniques.

315. *Research Methodology in Physical Education*. I, S. 3 HR. PR: Graduate standing or consent. Application of historical, descriptive, and experimental research strategies and designs to physical education. (Also listed as PET 315.)

316. *Sport Marketing Research Methods*. I. 3 HR. PR: Graduate standing or consent. Application of the scientific method to sport marketing; emphasis on evaluating and conducting survey research in sport marketing; marketing project includes consumer behavior research in sport settings.

320. *Individual Interaction in Sport and Physical Activity*. I, S. 3 HR. PR: SS 315. Designed to acquaint the student with the reciprocal relationships between sport and physical activity and the societies and culture out of which sport emerges.

340. *Psychology of Sport and Physical Activity*. I, S. 3 HR. PR: SS 315. Psychological effects and implications of man's participation in sport and physical activity. Emphasis is on the personality and behavioral and motivational dynamics of sport involvement.

345. *Group Influences in Sports*. I. 3 HR. PR: SS 320 and SS 340. The manner and degree to which individuals are affected by involvement in sport and group interactions.

350. *Paciolan Computer Systems*. I, II. 3 HR. PR: Sport management majors only. Computer laboratory; emphasis on general ledger (budgeting), support group (fund raising), and ticketing software of the PSI sport computer system.

370. *Sport Finance*. II. 3 HR. PR: Graduate standing or consent; majors only. Financial operations and economic impact of scholastic, intercollegiate, and professional sport administration; concepts of budgeting, auditing, reporting, and computer use; current developments in the field.

385. *Internship-Sport Management*. I, II, S. 1-6 HR. Sport Management on-site working relationship with a sport organization to gain practical "hands-on" experience in a collegiate athletic organization, professional sport franchise, or variety of sport-related businesses.

386. *Internship-Sport Behavior*. I, II, S. 1-6 HR. Sport Behavior supervised experience in various aspects of sport psychology teaching, research, and/or practice at on-campus or off-campus sites.

391. *Advanced Topics*. I, II, S. 1-6 HR.

397. *Research/Thesis*. I, II, S. 1-15 HR.

420. *Psychological Sport Performance Enhancement*. II. (Alternate years.) 3 HR. An in-depth examination of commonly used interventions designed to maximize the performance of individual athletes and teams.

421. *Counseling College Student-Athletes*. II (Alternate years.) 3 HR. An exploration of psychosocial aspects of college student-athletes' life experiences and commonly counseling concerns to include individual and systems intervention used to assist this at-risk group.

422. *Exercise and Health Psychology*. I. 3 HR. Major theories and techniques of health behavior change and health behavior assessment especially with respect to exercise.

423. *Psychological Aspects of Sport Injury*. I. 3 HR. Explores the psychosocial antecedents to athletic injury and factors related to the psychological experience and treatment of the injured athlete.

424. *Sport Psychometrics*. I. (Alternate years.) 3 HR. PR: SS 340. Psychological assessment and evaluation in relation to sport and exercise settings.

425. *Educational Sport*. II. 3 HR. PR: STAT 311 and SS 465. The group dynamics of the sport situation for purposes of gaining insight into techniques and methods of modifying social behavior through physical education sport activities.

446. *Advanced Measurement in Physical Education*. II, S. 3 HR. PR: SS 315. Extension and application of basic concepts of measurement and statistical evaluation to physical education.

450. *Sport Marketing*. I. 3 HR. PR: Graduate standing. Advanced analysis of marketing sport enterprises; the marketing planning process and marketing information systems.

460. *Sport Management Processes*. II. 3 HR. PR: Consent. Analysis of management processes utilized in sport businesses. A focus is on the planning, organization, leading, and evaluation processes that are unique to the sport industry. Discussion, debate, and position papers on these four management processes.

465. *Professional Physical Education Resource Seminar*. S. 3 HR. PR: Graduate standing. Introductory seminar for doctoral professional physical educators. Discussion, debate, and position statements on critical issues facing the physical education profession. (Required for all doctoral students.)

480. *Dissertation/Thesis Seminar*. II. 3 HR. PR: Graduate standing. Critical analysis of the graduate student's dissertation or research proposal. (Required for all doctoral students.)

490. *Teaching Practicum*. 1-3 HR.

491. *Advanced Study*. I, II, S. 1-6 HR.

492. *Special Seminars*. I, II, S. 1-6 HR.

493. *Special Seminar*. I, II, S. 1-6 HR.

494. *Special Seminar*. I, II, S. 1-6 HR.

495. *Special Seminar*. I, II, S. 1-6 HR.

496. *Graduate Seminar*. I, II, S. 1-6 HR.

497. *Research*. I, II, S. 1-15 HR.

498. *Dissertation*. I, II, S. 2 - 4 HR.

499. *Colloquium*. I, II, S. 1-6 HR.

School of Social Work

Karen V. Harper, Ph.D., Dean

Graduate Program in Social Work

Master of Social Work (M.S.W.)

The School of Social Work began as a department in the College of Arts and Sciences in the early 1930s. In 1971, the School became an independent unit, located in Allen Hall on the Evansdale Campus. All degree programs offered by the School are accredited by the Council on Social Work Education, and our graduates meet the criteria for seeking social work licensure in most states.

The graduate program in social work offers advanced study and training in preparing social workers for leadership roles in small towns and rural areas. The School of Social Work is nationally recognized in the area of rural social work practice and nonprofit management. Faculty regularly contribute to the social work field through presentations, papers, conferences, seminars, and research. Students have the opportunity to focus their practice interests by selecting an area of social work practice intervention as well as a Field of Practice concentration within our M.S.W. program. Currently, the School supports practice tracks in Direct Practice, Community Organization and Social Administration, and Advanced Generalist, and Fields of Practice in the areas of Aging and Health Care, Children and Families, and Mental Health. Students have the opportunity to do their field internships with agencies throughout West Virginia and adjacent areas. A dual degree option is also offered in conjunction with the Department of Public Administration in the College of Arts and Sciences.

The School of Social Work supports both full-time and part-time graduate study at the main campus and part-time graduate study at our off-campus site in Charleston, the state capitol. Students who have graduated from a baccalaureate program in social work accredited by the Council on Social Work Education may request a review for advanced standing in the M.S.W. program when they apply for admission.

Students interested in applying to the School or wishing additional information should address inquiries to M.S.W. Admissions, School of Social Work, West Virginia University, P.O. Box 6830, Morgantown, WV 26506-6830. Phone: (304) 293-3501.

Graduate Faculty

[†]Indicates regular membership in the graduate faculty.

Professors

Marjorie H. Buckholz-Cleveland, Ph. D. (WVU). Emerita.

[†]Patty A. Gibbs, Ed.D. (WVU). B.S.W. Program Director. Social work values and ethics, Women's issues, Gatekeeping in social work education.

[†]Karen V. Harper, Ph.D. (Ohio St. U.). Dean. Social administration, Child welfare.

[†]Nancy L. Lohmann, Ph.D. (Brandeis U.). Social gerontology, Research measurement.

[†]Roger Lohmann, Ph.D. (Brandeis U.). Nonprofit management, Social welfare history, Social Policy, Rural social services.

Robert A. Porter, Ph.D. (Brandeis U.). Emeritus.

Victor L. Schneider, Ph.D. (U. Mich.). Emeritus.

LeRoy G. Shultz, M.S.W. (Wash. U.). Emeritus.

Associate Professors

Eleanor Blakely, Ph.D. (UNC). Social welfare policy/administration, Poverty.

[†]Barry L. Locke, Ed.D. (WVU). Assistant Dean & M.S.W. Program Director. Social Work in rural areas, Generalist practice, Program development.

Caroline T. Mudd, M.S.W. (U. Penn.). Emerita.

Neal A. Newfield, Ph.D. (Texas Tech U.). Strategic therapy, Hypnosis, Solution focused therapy.

Assistant Professors

Sylvia Hawranick, Ed.D. (WVU). Juvenile services. Residential treatment, Higher education administration.

Richard Pozzuto Ph.D. (U. of Wash.). Clinical social work, Politics and practice of social work research.

Elizabeth Randall, Ph.D. (U. GA.). Clinical social work, Mental health.

Joan E. Saltman, Ph.D. (U. of Md.). Human Behavior, Family social work, Multicultural issues.

Dong Pil Yoon, Ph.D. (Illinois). Child welfare, Adoption, Research and statistics.

Clinical Instructors

Linda Ferrise, M.S.W. (WVU). Clinical social work, Mental health, Adoption.

Doris Nicholas, M.S.W. (WVU). Social Work in health care, AIDS/HIV, Multicultural practice.

Instructors

R. Larry Beckett, M.S.W. (WVU). Director Off-Campus Program. Social Planning, Health Care Policy.

Helen M. Hagerty, M.S.W. (U. Pitt). Coordinator of Field Instruction.

Craig Johnson, M.S.W. (WVU). Aging, Social welfare policy, History of Social welfare.

Academic Professionals

Mary Alice Dunn, M.S.W. (WVU). Program Manager for Continuing Education.

Brenda Morgan-Patrick, M.S.W. (WVU). Admissions Coordinator and Academic Counselor.

Social Work

Karen V. Harper, Ph. D., Dean of School of Social Work

708 Allen Hall

Degree Offered: Master of Social Work

Accreditation and Licensure

The School of Social Work and its degree programs are fully accredited by the Council on Social Work Education. Graduates of the M.S.W. program are eligible to sit for licensure examinations as social workers in West Virginia and most other states. The graduate program is part of the comprehensive program of professional education in social work offered by the School of Social Work, including degree programs at the baccalaureate and master's levels and a range of continuing education opportunities on the campus and in other areas of West Virginia.

Program Emphasis

Social work is primarily concerned with enhancing the problem-solving, coping, and developmental capacities of people, promoting effective and humane operation of resources and service delivery systems, linking people with appropriate resources and service opportunities, and improving social policy. Toward this end the graduate program concentrates upon offering advanced specialized training for social work practice, with an emphasis on rural areas and small towns.

The School of Social Work is nationally recognized in the area of rural social work practice, and the faculty members regularly contribute to this field through presentations, papers, conferences, and research.

Career Goals

Graduates of the M.S.W. program are employed throughout the United States and Canada. They work as individual, family, and group treatment specialists, planners, community organizers, and social researchers. They also work as social work educators and administrators in a variety of programs such as mental health clinics, hospitals, correctional institutions, courts, delinquency programs, aging programs, family counseling agencies, child protective agencies, public welfare departments, child development programs, drug and alcohol abuse programs, public schools, community action agencies, settlement houses, city governments, state government planning agencies, federal administrative agencies, and private research and development organizations concerned with human problems.

There has been a constant growth in the need for professional social workers. It is anticipated by the Bureau of Labor Statistics and other research bodies that the demand for social workers will continue to increase in numbers and in varieties of programs in which social workers are employed. The WVU social work curriculum is designed to help students prepare for these careers. Students are required to work closely with their academic advisors in selecting appropriate components in class and field learning to meet their individual needs.

Curriculum and Degree Requirements

Degree Requirements

The degree of master of social work (M.S.W.) is conferred upon those students who satisfactorily complete the requirements as established for graduate education. These requirements are:

- Satisfactory completion of no less than 58 semester hours for those admitted to the regular M.S.W. program and 43 semester hours for those admitted to the advanced standing M.S.W. program. These hours may be earned through the Morgantown program on the main campus, as well as at the off-campus site at Charleston.
- Satisfactory completion of all components called for by the degree track to which students are admitted in the graduate program.

Transfer Credits

- Students may request transfer credit for up to 12 hours earned in graduate study in approved courses. Requests for such transfer credit must be made at the time of application to the program and will be evaluated by the Admissions Committee.

Curriculum Components

These components include course work in social work practice, social welfare policy, human behavior and social environment, social work research, a field of practice area, and field instruction. A copy of the typical plan of study for degree candidates is available upon request from the School of Social Work.

Practice Tracks

- **Direct practice:** This track prepares students with the knowledge and skills to provide direct and clinical services to individuals, families, and small treatment groups.
- **Community organization and social administration:** This track prepares students with the knowledge and skills to provide leadership to communities in the development, administration, and support of service programs.
- **Advanced generalist:** This track prepares students who wish to have a broad knowledge and skill base for a variety of advanced practice roles.

Fields of Practice

Aging and Health Care

The aging and health care concentration prepares students for careers in aging and health services delivery. Emphasis is on social work practice in health care settings, including hospitals, nursing homes, and rural primary care clinics. Students acquire knowledge and skills in carrying out professional roles in discharge planning, creating support networks, and serving as members of medical ethics committees.

Children and Family

The children and family concentration provides students with the knowledge, skills, and values that enable the student to perform competently in human service systems programs and policies directly affecting family well-being. These social work roles encompass preventing and treating neglect, abuse and exploitation; developing and supervising alternative family care systems; and deinstitutionalization. Particular emphasis is placed on direct practice roles in delivering family services.

Mental Health

The mental health concentration provides students with a generic model of practice as adapted to the evolving field of mental health. Particular knowledge and skill emphasis is placed on brief treatment models, the use of community support systems, and case management systems for independent living.

Field Instruction

Field instruction opportunities are available throughout West Virginia and adjacent areas, as well as in a select number of settings outside the region. Classes focus upon a blend of local, regional, and national perspectives. Field instruction provides the student with an opportunity to test classroom knowledge as well as to develop and refine advanced practice skills within the chosen field of practice area.

Field placement is typically completed on a concurrent plan requiring 24 hours of field instruction activity each week throughout the second year of study. Part-time field instruction options may be negotiated as needed, but must be completed within the four year time frame for part-time study.

Regular M.S.W. students are in the field between July 1 and May 15 of the second year of study. Advanced standing M.S.W. students are in the field between August 15 and May 15 of the second year of study. Students are required to take at least 3 credits of classroom course work concurrently with field placement and to complete assignments designed to facilitate the integration of field and classroom study.

Decisions regarding the field placement assignment are jointly reached by the student, faculty advisor, and field instruction coordinator. Only sites on the School of Social Work's approved list, containing over 125 approved agencies, may be used for field instruction.

GPA Requirements for Good Standing

All graduate courses must be completed with a grade of C or better and students must have an overall minimum grade-point average of 2.75 prior to entering field placement and to be eligible for graduation. Students may repeat any course for which the final grade is less than C one time only.

Joint M.S.W./M.P.A.

A joint degree option resulting in the master of social work (M.S.W.) and master of public administration (M.P.A.) is available through the School of Social Work and the Department of Public Administration of the College of Arts and Sciences. For a student admitted to the regular M.S.W. program, a total of 82 credit-hours are required to meet the joint degree requirements. For a student admitted to the advanced standing M.S.W. program, a total of 67 credit hours are required to meet joint degree requirements. Many students complete such requirements through one or more additional semesters of study beyond the semesters required for the M.S.W. degree. Students admitted to the M.S.W. degree program may not receive credit toward the degree for courses numbered 200 to 299. Students wishing to transfer credit from another program are also subject to this restriction. Applicants for the joint degree program apply to each program separately, specifying on each application that they are a joint degree applicant. Applicants must meet the admission requirements of each program and acceptance by one program does not guarantee acceptance by the other.

Additional information and descriptive materials about the joint degree program are available from either M.S.W. Admissions, School of Social Work, West Virginia University, P.O. Box 6830, Morgantown, WV 26506-6830, or the Department of Public Administration, West Virginia University, P.O. Box 6322, Morgantown, WV 26506-6322.

Admission to the M.S.W. Program

Students admitted to the graduate program may be admitted to the regular M.S.W. program (58 credit hours) or to the advanced standing M.S.W. program (43 credit hours). Through both the regular M.S.W. program and the program of advanced standing, students are exposed to the areas of social work practice, social welfare policy, theories of human behavior and social environments, social work research, and field instruction. Students requesting admission must demonstrate the following:

- Proof of academic achievement. Graduate regulations require an undergraduate grade-point average of at least 2.75 for approval of candidates as a regular graduate student. An accepted applicant whose grade-point average is less than 2.75 is classified as provisional. See the graduate catalog section titled Classification of Graduate Students for a description of admission categories.
- Aptitude for graduate study as evidenced by performance on the Graduate Record Examination.
- Evidence of potential to practice social work, such as commitment to human service, and a concern and ability to work effectively with people.
- Evidence of having successfully completed at least 30 hours of upper-level courses in the liberal arts.

For full-time applicants, preference will be given in admissions to students who have a total of at least one year of paid and/or volunteer human service work experience. Applicants for the part-time program must have the equivalent of two years work experience in human services.

Admission Eligibility

Regular Program

Applicants meeting the following criteria may be eligible for admission to the regular M.S.W. program (58 credit hours):

- Students with a baccalaureate degree in social work or social welfare whose cumulative grade-point average in their social work courses is below 3.0 (on a 4.0 scale).
- Students with a baccalaureate degree in social work or social welfare whose cumulative grade-point average in all courses is less than 2.75. Such students may be admitted as provisional students in the regular M.S.W. program.
- Students with a baccalaureate degree in a field other than social work.

If enrolled full-time, regular program students begin their study in August and are scheduled to complete their requirements within 21 months.

Advanced Standing

Increasingly aware of the maturation of baccalaureate social work education (in which the WVU School of Social Work has been a national leader), the graduate program provides the opportunity to simultaneously broaden and deepen the knowledge and skill levels of those with baccalaureate education in social work through a program of advanced standing.

For those who do not have a baccalaureate degree in social work or who do not qualify for the advanced standing program, the regular M.S.W. degree is offered (see above criteria).

Applicants who have a baccalaureate degree in social work from a program accredited by The Council on Social Work Education are eligible for admission to the advanced standing M.S.W. program (43 credit hours) if they meet the following criteria:

- A cumulative grade point average of 2.75 or higher (on a 4.0 scale) in all courses.
- A cumulative grade point average of 3.0 or higher in social work courses.

If enrolled as full-time students, advanced standing students begin their program of study in January and are scheduled to complete the program over the following 17 months.

Part-Time Study

Applicants may be admitted as part-time students to either the regular M.S.W. program or advanced standing M.S.W. program. Part-time students must follow a degree plan that provides for the appropriate sequencing of courses. Students are required to complete at least six credit hours each semester while enrolled as part-time students. The entire degree may be completed on a part-time basis; however, the plan of study must be completed within a four-year time span.

Application Deadlines

Applications must be completed by March 1. Applicants whose admission files are completed after the deadline date will only be considered if space is available.

Full and part-time students admitted to the regular program are required to begin their program of study in August (fall semester).

Full and part-time students admitted to the advanced standing program are required to begin their program of study in January (spring semester).

The School does not admit students at any times other than those outlined above. Students interested in applying to the School or wishing additional information should address inquiries to: M.S.W. Admissions, School of Social Work, West Virginia University, P.O. Box 6830, Morgantown, WV 26506-6830. Phone: (304) 293-3501.

Summary of Degree Requirements for Advanced Standing M.S.W. Program

Curriculum Area	Credit Hours
Foundation Courses	9
SW 321 <i>Human Behavior and Social Environment</i>	3
SW 333 <i>Social Welfare Policy and Services</i>	3
Social Research Methods (SW 316 or 318)	3
Required Practice Track (select one option)	6
Direct Practice (SW 343 & 349)	6
COSA (SW 351 & 354)	6
Advanced Generalist (SW 343, 349, 351 & 354)	12*
Practice Track Crossover (required for direct practice track and COSA track)	3
Direct Practice students take either SW 351 or 354	
COSA students take either SW 343 or 349	
Required Field of Practice (select one option)	3
Aging and Health Care (SW 381)	
Children and Families (SW 377)	
Mental Health (SW 374)	
Field of Practice Electives (determined by student interest)	6
Field Instruction	16
Total	43

*Advanced Generalist students take all four of these courses instead of the cross-over requirement and only one practice elective.

Summary of Degree Requirements for Regular M.S.W. Program

Curriculum Area	Credit Hours
Foundation Courses	
Human Behavior and Social Environment (SW 321 & SW 347)	6
Social Welfare Policy and Services (SW 331 & 333)	6
Social Research Methods (SW 313 & either 316 or 318)	6
Social Work Methods (SW 340)	3
Required Practice Track (select one option)	6
Direct Practice (SW 343 & 349)	6
COSA (SW 351 & 354)	6
Advanced Generalist (SW 343, 349, 351 & 354)	12*
Practice Track Crossover (required for direct practice track and COSA track)	3
Direct Practice students take either SW 351 or 354	
COSA students take either SW 343 or 349	
Required Field of Practice (select one option)	3
Aging and Health Care (SW 381)	
Children and Families (SW 377)	
Mental Health (SW 374)	
Field of Practice Electives (determined by student interest)	6
Field Instruction	19
Total	58

*Advanced Generalist students take all four of these courses instead of the cross-over requirement and only one practice elective.

Social Work (SOWK)

313. *Social Work Research Methods*. I, II. 3 HR. (Research course.) Basic concepts in social research methods. Emphasis on conceptualization of social work problems for research, role of social science theories in research, measurement options in research design, and analysis of data.

316. *Evaluation Research in Social Work*. 3 HR. (Research course.) PR: SOWK 313. Methods of collecting, analyzing and interpreting data on the need for, implementation and effects of social interventions. Examination of the effects of political, ethical and resource variables on the research process.

317. *Strategies of Community Research*. S. 3 HR. (Research course.) PR: SOWK 313. Social systems approach to the study of community social phenomena in ecological context. Emphasis on the use of qualitative methods. Students engage in participant observation in natural field settings. (Graded as S/U.)

318. *Personal Practice Assessment*. I, II. 3 HR. PR: SOWK 313 or equiv. The use of single-system evaluation methods to assess the effectiveness of social work interventions, with an emphasis on using these tools to guide practice decision-making.

320. *Introduction to Growth and Behavior*. I. 3 HR. Study of behavior as basically learned responses acquired from social situations and experiences. Individual and group behavioral norms from varying and diverse sociocultural environments are examined.

321. *Introduction to Growth and Behavior*. II. 3 HR. PR: SOWK 320 or equivalent. Further study of psychosocial and cultural determinants designed to increase knowledge and understanding of individual and group behavior through an analysis of social organizations with a special focus on the impact of deprivation.

323. *Social Support Systems*. I, II. 3 HR. (Human Behavior and Social Environment course.) Social science theories pertinent to social support system concepts. Formally organized systems and natural helping networks are considered. Program models related to particular target populations, such as a mentally ill, the aged, etc., are examined.

324. *Human Service Organizations*. II. 3 HR. (Human Behavior and Social Environment course.) Forces that characterize the establishment, maintenance, and transformation of human service agencies.

331. *Social Welfare Policy and Services*. I. 3 HR. (Policy course.) Introduction to the history, development, and implementation of social policy in the United States. Special emphasis is given to those policies which have the greatest impact on non-metropolitan areas and the Appalachian region.

333. *Social Policy Analysis*. II, S. 3 HR. (Policy course.) PR: SOWK 331. Skill development in techniques of social policy analysis. Selection of analytical methods and issues offered in different sections.

340. *Introduction to Social Work Practice*. I. 3-5 HR. (Practice course.) Focuses on developing the basic framework of social work practice theory and professional values to working with individuals, groups, families, and communities.

341. *Social Treatment Groups*. II. 3 HR. (Practice course.) PR: SOWK 340. The use of social relationships in small groups in treating personal problems.

343. *Psychopathology and Social Work Practice*. I, II. 3 HR. PR: SOWK 340. Nature, presenting characteristics, and intervention with the major forms of mental and emotional maladjustment that impact social functioning, adaptation, and life satisfaction from the perspective of the social work profession.

345. *Supervision in Social Work*. II, S. 3 HR. (Practice course.) PR: SOWK 340. Functions, conflicts, and dynamics of supervision of professionals, and the relationship of ethical and value principles.

347. *Multicultural Social Work Practice*. I, II. 3 HR. Understanding and appreciating human differences as encountered in professional practice. Practicing with sensitivity to influences such differences may present to the social worker.

349. *Advanced Practice with Individuals/Families*. I, II 3 HR. PR: SOWK 340 or consent. Theories, concepts, and value issues associated with providing direct/clinical social work services to individuals. Students will also be involved with skill building exercises through classroom activities.

351. *Social Management/Rural Communities*. I, II. 3 HR. (Practice course.) PR: SOWK 340. Practice issues in skill development and community organization and development with special emphasis on rural communities.

352. *Social Planning*. II. 3 HR. (Practice course.) PR: SOWK 340. Practice issues in skill development related to social components of comprehensive planning and functional planning systems in health, aging, manpower, social service, and other areas.

354. *Social Agency and Program Administration*. I, II. 3 HR. (Practice course.) PR: SOWK 340. Practice issues in skill development in programming, budgeting, organization, staffing, and control of social agencies and programs.

371. *Social Work With the Aged*. I. 3 HR. (Concentration course.) Human aging as a problem in social theory, research, and practice.

372. *Concepts and Theories in Social Gerontology*. S. 3 HR. (Concentration course.) PR: SOWK 371 or consent. Major conceptual and theoretical perspectives in social gerontology are applied to social work practice for the aged.

374. *Community Mental Health*. I. 3 HR. (Concentration course.) An overview of the field of mental health which addresses major policy, program, practice, theory, and research issues as reflected in recent reports of the President's Commission on Mental Health. Current federal and state plan documents are examined.

375. *Individual Consultation*. I, II, S. 1-3 HR. Individual directed study to develop extensive knowledge in social work areas of student's interest.

376. *Primary Prevention in Social Work*. S. 3 HR. (Concentration course.) PR: SOWK 374 or consent. This course explores varying conceptual approaches to primary prevention, the social science theories and research on which they are based, and their adaption to major modes of social work practice. Specific substantive knowledge problems are addressed.

377. *Introduction to Family Social Work*. I. 3 HR. (Concentration course.) Describes the demography of the population at risk, identifies family theory, major programs, and services and policies. Examines gaps in services and major styles of family intervention in social work roles.

378. *Family Victimology*. S. 3 HR. PR: SOWK 377 or consent. The interface of social work practice in family victimology, with emphasis on victim welfare policy and service, victim compensation programs, and victim prevention. Social concern for physical and sexual abuse, battery, and related topics.

379. *Social Work with Couples/Families*. 3 HR. (Concentration Course.) PR: SOWK 377 or consent. This course explores social work practice focused on couples or families as a unit. Emphasis on intervention models oriented to couple and family relationship counseling and on clinical social work techniques.

380. *Special Topics*. I, II, S. 1-6 HR. Topics include: (A) Statistics for Social Work Practice; (B) Methods of Data Collection; (C) Computer Applications; (D) Family Sexuality; (E) Service Strategies of Aging; (F) Health Planning and Policy; (G) Program and Practice Models; (H) Social Work in Health Care; (I) Social Work with Substance Abuse.

381. *Social Work in Health Settings*. I. 3 HR. Comprehensive strategies for serving clients with physical and/or emotional problems and their families with an emphasis on direct practice approaches. Practice in traditional and nontraditional settings is examined.

481. *Advanced Field Instruction 1*. I, II, S. 3-14 HR. PR: Consent. Graduate field instruction in selected settings under the general direction of the faculty.

482. *Advanced Field Instruction 2*. I, II, S. 3-14 HR. PR: Consent. Graduate field instruction in selected settings under the general direction of the faculty.

497. *Research*. I, II, S. 1-15 HR.

Part 5 Special Opportunities

Harley O. Staggers National Transportation Center

David R. Martinelli, Ph.D., Director

Department of Civil and Environmental Engineering

The Harley O. Staggers National Transportation Center was created through federal legislation to serve as a nucleus for transportation research, education, service, and technology transfer for West Virginia and the Mid-Atlantic region. Since its creation, faculty associated with the center have performed research projects, technology transfer events such as short courses, and undergraduate and graduate educational activities.

The center is located at West Virginia University in the Department of Civil and Environmental Engineering (CEE). Faculty from the departments of CEE, Mechanical Engineering, Industrial Engineering, Business and Economics, Forestry, Law, and Medicine have all participated in research through the center. Over the years, the objectives of the center have included the following:

1. To promote and coordinate transportation related research activities at West Virginia University for all modes; particularly in the areas of traffic engineering, transportation economics, planning, infrastructure management, highway design, transportation safety, environmental issues, and structures and materials.
2. To serve as technical and educational support to West Virginia agencies, legislature, municipalities, and private citizens. Such as advising legislative committees and other constituencies on alternative transportation policies.
3. To conduct and support transportation related education activities through the Department of Civil and Environmental Engineering and other WVU academic departments. The centerpiece of these activities are the course offerings and degree programs.
4. To conduct and support technology transfer activities. Such activities include short courses, dissemination of research reports, publication of journal articles, and participation in conferences and other professional meetings.

Housing Information and Research Center

The West Virginia University Housing Information and Research Center was established in 1981. The center's primary mission is to serve the general public and professionals in the field of housing and energy by providing consultant services, education programs, and demonstrations on alternative housing and energy. The center is administered by the technology education program in the College of Human Resources and Education. For further information, call (304) 293-3803.

International Center for Disability Information (ICDI)

The International Center for Disability Information has three emphases, (a) Rehabilitation Research and Training Center, (b) Job Accommodation Network, and (c) Special Studies Involving Disability. This organization houses information databases on vocational rehabilitation, incidence-prevalence of job accommodations, and disability legislation. Faculty and staff are involved in research, training, and service activities. Students in assistantships and internships learn about rehabilitation research and practice.

The West Virginia Rehabilitation Research and Training Center was established in 1965 to carry out programmatic research in the area of disability. The Center's core emphasis is the application of information technology to enhance rehabilitation. Decision support systems are studied and developed to enhance the national rehabilitation service-delivery system. This program is funded by the National Institute on Disability and Rehabilitation Research (NIDRR) of the U.S. Department of Education.

The Job Accommodation Network is an international information service about job accommodations and the employability of people with functional limitations. This program is funded through the President's committee on Employment of People with Disabilities (PCEPD) of the U.S. Department of Labor.

Special Studies Involving Disability includes projects on consumer needs assessment, program evaluation of vocational rehabilitation, and referral system for vocation rehabilitation providers. Such projects are funded by human-service organizations in various states and the Social Security Administration (SSA).

Multidisciplinary Studies

Multidisciplinary Studies (MDS) courses are those which analyze significant issues, problems, or themes by applying two or more disciplines to them; or which explore the theoretical and methodological relationship of two or more disciplines to each other; or which involve a combination of disciplines so as to preclude their being classified realistically as one of humanities, social science, or physical science.

Responsibility for approving MDS courses rests with the liberal studies program committee and the Faculty Senate. Each course has its own staff, drawn from the faculties of the schools and colleges of the University.

Multidisciplinary Studies (MDS)

250. *Issues in Gerontology*. II. 3 HR. PR: Consent. Analysis of societal aspects of aging and exploration of current issues in gerontology. Relating of gerontological concepts to previous course work and field experience.

National Research Center for Coal and Energy

In collaboration with the faculty of West Virginia University, the WVU National Research Center for Coal and Energy identifies, develops, promotes, coordinates, supports, and conducts multidisciplinary energy and environmental research and service programs. The NRCCE accomplishes its mission through the efforts of faculty, professionals, students, and external collaborators working through organized program units, each of which serves the specialized needs of its sponsor and user community. The center is located on the Evansdale campus in a building that includes a multimedia meeting facility, an analytical laboratory, a high bay laboratory, and offices.

The center coordinates programs in excess of \$10 million annually. Through its research and service programs, the center supports a number of master's and Ph.D. students. At the center, graduate students will find a limited number of service-related assistantships in the

service programs. Research assistantships typically are handled by the academic departments that are responsible for conducting the NRCCE-related research programs. Students interested in learning about research opportunities with NRCCE should contact the academic department in which they plan to enroll to find out about the availability of NRCCE-funded assistantships in that department. To learn more about the types of research and service activities coordinated by the center, students are encouraged obtain a copy of the NRCCE annual status report by contacting the NRCCE Technical Communications Division at (304) 293-2867 ext. 420, West Virginia University, National Research Center for Coal and Energy, PO Box 6064, Morgantown, WV, 26506-6064, world wide web site <http://www.nrcce.wvu.edu>.

Among some of the NRCCE programs are: the Appalachian Oil and Natural Gas Research Consortium, the Petroleum Technology Transfer Council, the Energy and Environmental Research Enhancement Program, Industries of the Future WV Electric Industry Research Group, the National Alternative Fuels Training Program, the National Drinking Water Clearinghouse, the National Environmental Training Center for Small Communities, the National Onsite Demonstration Project, the National Small Flows Clearinghouse, the National Mine Land Reclamation Program, the West Virginia Water Research Institute, and the National Environmental Education and Training Center.

Oak Ridge Associated Universities (ORAU)

Since 1957, students and faculty of West Virginia University have benefited from its membership in Oak Ridge Associated Universities (ORAU). ORAU is a consortium of colleges and universities and a management and operating contractor for the U.S. Department of Energy (DOE) located in Oak Ridge, Tennessee. ORAU works with its member institutions to help their students and faculty gain access to federal research facilities throughout the country; to keep its members informed about opportunities for fellowship, scholarship, and research appointments; and to organize research alliances among its members.

Through the Oak Ridge Institute for Science and Education, the DOE facility that ORAU manages, undergraduates, graduates, postgraduates, and faculty enjoy access to a multitude of opportunities for study and research. Students can participate in programs covering a wide variety of disciplines including business, earth sciences, epidemiology, engineering, physics, pharmacology, ocean sciences, biomedical sciences, nuclear chemistry, and mathematics. Appointment and program length range from one month to four years. Many of these programs are especially designed to increase the numbers of underrepresented minority students pursuing degrees in science and engineering related disciplines. A comprehensive listing of these programs and other opportunities, their disciplines, and details on locations and benefits can be found in the *Resource Guide*, which is available by calling either of the contacts below.

ORAU's Member Services office seeks opportunities for partnerships and alliances among ORAU's members, private industry, and major federal facilities. Current alliances include the Pan American Association for Physics, Materials Science Forum, and international initiatives in support of the New Independent States and the republics of Central and Eastern Europe. Other activities include faculty development programs, such as the Junior Faculty Enhancement Awards and the Visiting Industrial Scientist Program, and various services to chief research officers.

For more information about ORAU and its programs, contact Dr. Richard A. Bajura, ORAU Council member, or Ms. Margaret Andreas, Program Assistant, WVU NRCCE, at (304) 293-2867; or contact Monnie E. Champion, ORAU Corporate Secretary, at (615) 576-3306.

Regional Research Institute

The Regional Research Institute is dedicated to multidisciplinary research on the economic and social development of lagging regions such as Appalachia in the United States. It focuses on theories and history of regional development, methods for studying regions, and policies for stimulating their development. The Institute creates learning opportunities and provides research support for faculty members and students. It is an internationally prominent center for the advancement of regional science—an interdisciplinary field that links economics, geography, planning, and other social sciences. Throughout its distinguished three-decade history, the Institute has been a separate unit, independent of any college. Currently, the Institute brings together twenty faculty associates drawn from nine departments in five colleges, a four-person regional science faculty, an extended network of scholars elsewhere in the United States and abroad, and an outstanding group of graduate and undergraduate students.

The Institute has a long-standing reputation for its many contributions to regional science. Regional scientists use quantitative methods and mathematical models to study economic and social phenomena in a regional setting. The Institute's forte has been its pioneering research on methods for analyzing regions and its multidisciplinary approach to studying regional development. Visiting scholars and graduate students from abroad are an integral part of the Institute community. The Institute's journal, *International Regional Science Review*, circulates in more than sixty countries.

The Institute provides research experience and training to students but offers no degree program. Its regional science faculty has long staffed the regional economics doctoral courses in economics, and its alumni are among the nation's leading regional economists. A new set of courses will complement the graduate programs in agricultural economics, natural resource economics, economics, and geography.

Graduate research assistants are nominated by their departments or by faculty associates. The Institute prefers to hire doctoral candidates who have completed one year of graduate study, but master's candidates, undergraduates, and entering graduate students are considered. Most students are in economics, agricultural economics, or natural resource economics, but geography, history, law, and sociology students are regularly represented, too. The students have offices at the Institute and state-of-the-art computing equipment. As their educations progress, so do their roles in research projects. They learn skills, conduct and publish research, and present papers at conferences. In 1993, three students completed dissertations based on their research at the Institute. They continued the Institute's well-established student tradition of writing articles or prize-winning papers while serving as research assistants. Final-year fellowships permit exceptional students to finish their dissertations and prepare their research for publication.

The Regional Research Institute is a National Science Foundation site for research experiences for undergraduates. Each year, 12 students, half from WVU and half selected nationally, spend their junior year at the Institute, conducting research with a faculty mentor and participating in the University's honors program.

For further information about the Institute, contact the Regional Research Institute, West Virginia University, 511 North High Street, P.O. Box 6825, Morgantown, WV 26506-6825; telephone 304-293-2897; fax 304-293-6699; or e-mail RRI@wvnm.wvnet.edu.

Technology Field Service

The Technology Field Service Center was established in 1970. The primary mission of the center is to provide consultant personnel, development, and program design services for schools, businesses, and industries that have education and training needs in the technologies. The center is administered by the technology education program in the College of Human Resources and Education. For further information call (304) 293-3803.

University Affiliated Center for Developmental Disabilities (UACDD)

The mission of the West Virginia University Affiliated Center for Developmental Disabilities (UACDD) is to enhance the quality of life of individuals of all ages with developmental and other disabilities so that they and their families can experience productive, independent, and totally integrated lives. The mission is accomplished by support provided in the following areas: preparation of personnel; services and supports, including community training and technical assistance; and dissemination of information and research.

This mission is based upon the philosophy that: a) individuals with developmental and other disabilities have the right to productive, independent and totally integrated lives; b) family and community are the basis for independence and integration; c) systems and services should be consumer-driven; and d) a coordinated, interagency interdisciplinary focus is critical to enhancing the quality of life of individuals with developmental and other disabilities.

The Center's mandate is to serve, through academic excellence, as a state resource center for developmental and other disabilities and to: (a) provide interdisciplinary professional educational experiences including preservice training for students for positions in the field of developmental and other disabilities and outreach training for individuals currently employed or involved in the field of developmental and other disabilities; (b) provide high quality services for persons of all ages with substantial disabilities and their families; (c) provide technical assistance to persons whose work relates to the field of developmental and other disabilities, including service providers, parents, agencies, and other organizations at the local, state, and national levels; (d) engage in research and inquiry that will contribute to the understanding and amelioration of developmental and other disabilities; and (e) disseminate information to audiences on effective practices and programs, training techniques, and research findings relevant to the field of developmental and other disabilities. This Center is funded by the U.S. Department of Health and Human Services/Administration on Developmental Disabilities/Administration on Children and Families.

WVU Extension Service

The WVU Extension Service, part of an educational network of 105 land-grant universities, takes the helping hand of West Virginia University directly to thousands of West Virginians in communities scattered across the state. Through its Extension Service, the University provides a "mini campus" in each of the state's 55 counties. The work at these locations addresses a wide variety of community issues via a nontraditional mix of learners, faculty, staff, and volunteers.

Drawing on the strengths of WVU's many academic disciplines, Extension educators target communities' social, economic, environmental, and technical problems. Some Extension educators work out of buildings on WVU's traditional campuses, such as those located in Morgantown. But many Extension faculty work out of offices in WVU Extension's county settings, such as those generally located in or near each county's governmental seat. Working daily with local residents, Extension faculty find their lives

often intertwine with the issues that confront their local communities. They are committed to helping people find answers that work. As they solve problems along with local citizens—individually and in groups—Extension faculty and staff translate WVU's research and knowledge into action.

When graduate and undergraduate students take part in this action, they find the WVU Extension Service to be a fertile, flexible provider of a variety of internship, work-study, and volunteer experiences. Extension educators may involve students in some or in all phases of their educational projects—research, design, delivery, and evaluation. Depending on the project, students may have hands-on experience with video production, Web site development, distance education, publication design and production, television production, curriculum design and development, and classroom teaching.

However, students may not be familiar with the diversity of experiences available to them through the WVU Extension Service. Students may not equate the name "WVU Extension Service" with educational programs on and off campus. Often, those who do recognize the name generally are familiar only with a segment of Extension's multifaceted programs.

Extension programs have roots in many career fields. The list includes agriculture, business administration, child development, computer science, communications, environmental science, engineering, counseling and guidance, curriculum design, health education, home economics, journalism, and safety. Regardless of their academic disciplines, today's students may find rich learning experiences—and even rewarding careers—among Extension's diverse educational programs. Whether on campus or off campus, WVU students are invited to work with the WVU Extension Service:

- as it helps volunteer firefighters learn to protect families and property. (For example, in one year 13,000 volunteers participated in Fire Service Extension's fire suppression and rescue education programs throughout West Virginia.)
- as it helps children learn skills that help them build character and plan careers. (Annually, more than 20,000 youths "learn by doing" through 4-H projects and programs; another 20,000 special youth populations participate in school retention and enhancement programs.)
- as it helps individuals learn new ways to produce income. (For example, many West Virginians are learning direct marketing and other entrepreneurial skills. Some are participating in alternative product development projects. The multi-county endeavors include the aquaculture freshwater trout ventures, the pepper production and marketing program, and the commercial ginseng production pilot project.)
- as it trains volunteers to serve West Virginia's communities and schools. (During one program year, approximately 4,900 adult and youth volunteers were trained to help young people. Others were trained to serve on local boards and committees. Still others were trained to deliver expertise in specific subject matter, including gardening, literacy, and health and safety issues.)
- as it helps farmers improve productivity. (Through integrated pest management, farmers are increasing their savings by learning to control crop pests with fewer pesticides. Through total resource management, soil testing, and other Extension programs, farmers are employing better production and management practices for livestock and produce.)
- as it helps landowners learn to use natural resources more wisely. (West Virginia's natural resources are being protected as landowners use WVU Extension's water quality and timber conservation strategies and as homeowners adopt composting, yard waste management, and recycling techniques.)

- as it helps families become more resilient and healthy. (For example, during one program year, more than 8,000 homemakers learned nutrition, food management, and food preparation skills. Families in all 55 counties are participating in WVU Extension skill-building programs that are helping them employ positive child care, family communication, and health care strategies.)
- as it helps managers and laborers improve relations and workplace safety. (Every year, laborers throughout the state learn their rights and responsibilities for positive negotiations through courses conducted by the Institute for Labor Studies and Research. West Virginia's industries are increasing workers' safety while saving health care and business dollars by consulting with Safety and Health Extension (SHE). SHE's services include on-site safety audits and employee training in Occupational Safety and Health Administration (OSHA) guidelines.)
- as it helps local governments learn strategies to tackle economic and community development issues. (WVU Extension is helping communities plot their development for the next decade. Ten West Virginia localities in 1997 received planning assistance with their economic development and community design issues.)
- as it helps industries, manufacturers, and other businesses create and retain jobs for West Virginians. (Approximately 200 jobs have been created or saved recently through WVU Extension's business and retention assistance.)

WVU Extension programs are financed via a variety of funding combinations: federal appropriations and grants; state appropriations and grants; county commission, county school board and other local governmental appropriations; and private grants. Depending upon program priorities and funding, graduate and undergraduate internships, work-study appointments, and volunteer service positions may be available on the Morgantown campus and in any of the 55 counties. Program priorities and funding also determine the duration of appointments during regular semester and summer sessions.

For more information, contact the WVU Extension Service at (304) 293-5691; or write to Student Appointments, Office of the Associate Provost and Director, WVU Extension Service, 817 Knapp Hall, P.O. Box 6031, Morgantown, WV 26506-6031.

Part 6 Index

A

abbreviations used in course listings, 52
absences, 30
academic calendar, 488
academic integrity/dishonesty, 45;
 definition, 46; hearing procedure
 steps, 47
accountancy, professional, 193
 courses, 196
accounting faculty, 191
addresses for correspondence, 4
administration, student, 6
administrative assistant, 43
admission denial, 17
admissions, 17, 21
 academic standards, 21; classifica-
 tions, 21; enrollment regulations of
 non-degree students, 22; reclassifica-
 tion of provisional students, 23
advising, 24
 of non-degree students, 22
Advising Center assistant, 44
advisors, WVU board of, 5, 7
agricultural and resource economics, 61
agricultural education, 59
 courses, 59
agricultural sciences, 65
**Agriculture, Forestry and Consumer
Sciences, College of**, 53
 admission requirements, 54; agricul-
 tural and resource economics, 61;
 agricultural education, 59; agricultural
 sciences, 65; animal and veterinary
 sciences, 67; degrees, 10; faculty, 55;
 family and consumer sciences, 70;
 forestry, 73; genetics and develop-
 mental biology, 79; graduate programs
 and degrees, 53; natural resource
 economics, 81; plant and soil sci-
 ences, 85; reproductive physiology, 90
Aging, see Center on Aging
anatomy, 406
 courses, 408; faculty, 401
animal and veterinary sciences, 67
 courses, 67; faculty, 55
anthropology, see sociology and
 anthropology

application for graduate study, 16
academic records, 20; admission, 17;
admission denial, 17; concurrent or
additional master's degree, 18;
continuance, 18; English proficiency/
TOEFL scores, 19; financial docu-
ments/student visa, 19; forms/fees,
17; GMAT, 16; GRE, 16; initial inquiry,
16; intensive English program, 19;
international students, 18; letter of
inquiry, 18; non-degree applicants, 17;
official documents, 19; readmission,
18; reapplication, 18; second review,
17; transcripts, 17; transferring within
USA, 20

art, 226

 courses, 230; faculty, 224

Arts and Sciences, Eberly College of,
91

biology, 101; Center for Women's
Studies, 188; chemistry, 106; commu-
nication studies, 111; degree pro-
grams, 10; English, 114; faculty, 92;
foreign languages, 121; geography,
131; geology, 136; graduate programs
and degrees, 92; history, 143; liberal
studies, 151; mathematics, 153;
philosophy courses, 159; physics,
160; political science, 165; psychol-
ogy, 171; public administration, 177;
religious studies courses, 180;
sociology and anthropology, 181;
statistics, 184

assembly, faculty, 6

assistant vice presidents, 8

assistantships, 43

 administrative, 43; advising center, 44;
 renumeration, 44; research, 43;
 residence hall, 44; teaching, 43; terms
 of employment, 43

auditors, 26, 40

B

biochemistry, 410

 courses, 411; faculty, 401

biology, 101

 courses, 103; faculty, 92

Board of Advisors, 5, 7

Board of Regents, BA degree, 10

Board of Trustees 5, 7

Business and Economics, College

of, 190

accountancy, professional, 193

business administration, 197; degrees,
10; economics, 210; faculty, 191;

graduate programs and degrees, 190;

industrial relations, 216

business administration, 197

courses, 199

C

cabinet, WVU, 7

calendar, academic year, 488

campus maps, 490

CEMR, see Engineering and Mineral
Resources, College of

Center for Women's Studies, 188

courses, 189; faculty, 101

Center on Aging/Education Unit, 412

courses, 412

chaired and distinguished professors, 9

chemical engineering, 270

courses, 273; faculty, 263

chemistry, 106

courses, 108; faculty, 92

civil and environmental engineering, 276

courses, 278; faculty, 264

**College of Agriculture, Forestry and
Consumer Sciences**, see Agriculture,
Forestry and Consumer Sciences,
college of

College of Arts and Sciences, see
Eberly College of Arts and Sciences

College of Business and Economics,
see Business and Economics, college
of

College of Creative Arts, see Creative
Arts, college of

**College of Engineering and Mineral
Resources**, see Engineering and
Mineral Resources, college of

**College of Human Resources and
Education**, see Human Resources
and Education, college of

College of Law, see Law, college of

**College of Human Resources and
Education**, see Human Resources,
college of

COMER Museum faculty, 270

common course numbers and descrip-
tions, 51

communication studies, 111

courses, 112; faculty, 93

community health promotion, 413

courses, 414; faculty, 402

computer engineering faculty, 265

computer science and electrical
engineering, 284

courses, 294

computer science faculty, 265

concurrent or additional master's degree,
18

continuance, 18

correspondence, 4

counseling, 338

courses, 342; faculty, 333

counseling psychology faculty, 333

course information,

abbreviations used in course descrip-
tions, 52; plan for numbering courses,

51

Creative Arts, College of, 223

art, 226; degrees 11, faculty, 224;

graduate programs and degrees, 224;

music, 234; theatre, 245

D

deans, 8

degree completion, 30

course work requirements, 30;

graduate committees, 31; request for

degree, 30; research guidelines, 30;

theses and dissertations, 31; time

limitations, 30

degree programs, 10

dental hygiene, 254

courses, 255

Dentistry, School of, 252

degrees, 11; dental hygiene, 254;

endodontics, 255; faculty, 253; graduate

programs and degrees, 252; orthodon-

tics, 258

directors, 8

disability information, 37, 475

dissertations, 31

distinguished and chaired professors, 9

doctoral degree, 31

candidacy, 32; dissertation research,

33; dissertation submission, 34; final

examination, 33; summary of require-

ments, 35; time limitations, 33

DuBois Fellowships, 45

- E**
- Eberly College of Arts and Sciences,**
 - see Arts and Sciences, Eberly College of
 - economics, 210; courses, 213; faculty, 192
 - educational leadership studies, 345
 - courses, 346; faculty, 335
 - educational psychology, 349
 - courses, 350; faculty, 335
 - educational theory and practice faculty, 334
 - electrical engineering faculty, 266
 - elementary education, 353
 - courses, 354
 - employment (stipends), 43
 - endodontics, 255
 - courses, 256
 - Engineering and Mineral Resources, College of,** 260
 - chemical engineering, 270; civil and environmental engineering, 276;
 - computer science and electrical engineering, 284; degrees, 11; faculty, 263; graduate programs and degrees, 260; industrial and management systems engineering, 302; mechanical and aerospace engineering, 310;
 - mining engineering, 320; petroleum and natural gas engineering, 325;
 - safety and environmental management, 328
 - English, 114
 - courses, 117; faculty, 93
 - enrollment and registration, 23
 - academic rights, 26; advising, 24;
 - auditors, 26; credit limitations, 23;
 - credit overloads, 24; current information, 24; degree progress, 24; extended learning/off-campus study, 25;
 - final term, 26; full-/part-time, 26;
 - minimum enrollment, 25; non-degree students, 22; overloads, 24; plan of study, 24; records, 25; regulation of non-degree students, 22
 - exercise physiology, 417
 - courses 419; faculty, 402
 - extended learning, 25
 - extension and outreach (engineering) faculty, 269
 - Extension Service, WVU, 478
- F**
- facilities, fees and financial aid, 36
 - auditors, 26; fee charts, 48; fellowships, 44; lab fees, 40; libraries, 36;
 - music fees, 40; non-sufficient funds check policy, 42; loans and employment, 45; off-campus fees, 40;
 - renumeration policy, 44; residency policy, 38; veterans educational assistance, 45; waivers, 41
 - faculty, 14
 - appeals, 16; associate membership, 14; College of Agriculture, Forestry and Consumer Sciences, 53; College of Business and Economics, 190;
 - College of Creative Arts, 223; College of Engineering and Mineral Resources, 263; College of Human Resources and Education, 333;
 - continuance, 15; degree candidates, 15; Eberly College of Arts and Sciences, 91; evaluation of, 15;
 - exceptions, 15; pursuing advanced degrees, 16; regular membership, 14;
 - School of Dentistry, 252; School of Journalism, 391; School of Medicine, 401; School of Nursing, 443; School of Pharmacy, 452; School of Physical Education, 455; School of Social Work, 464; time schedule, 15
 - faculty assembly, 6
 - faculty senate, 5
 - family and consumer sciences, 70
 - courses, 71; faculty, 55;
 - fees and expenses, 40
 - additional fees for pharmacy graduate students, 49; auditors, 40; fee charts, 48; forms, 17; health sciences, 48;
 - Higher Education Resource Fund, 48;
 - lab fees, 40; music fees, 40; off-campus fees, 40; other fees, 50;
 - pharmacy, 49; public health program, 49; refund policy, 41; refund schedule, 42; regulations, 40; remission of fees, 43; waivers, 41; withdrawals, 29
 - fellowships,
 - Swiger Fellowships, 44; teaching fellow, 44; W.E.B. DuBois Fellowships, 45;
 - within the U.S. and abroad, 45
 - finance, faculty, 192
 - financial aid, 42

- assistantships, 43; employment, 43;
- fellowships, 44, 45; loans and employment, 45; remission of fees, 43;
- stipends (terms of employment), 43;
- Swiger Fellowships, 44; veterans educational assistance, 45; W. E. B. DuBois Fellowships, 45
- foreign languages, 121
 - courses, 126; faculty, 94
- forestry 73
 - courses, 74; faculty, 56
- full/part time enrollment, 26

G

- genetics and developmental biology, 79
 - courses, 80; faculty, 57
- geography 131
 - courses, 133; faculty, 95
- geology 136
 - courses, 140; faculty, 95
- governance and organization of WVU, 5
 - assistant vice presidents, 8; Board of Advisors, 5; Board of Trustees, 5;
 - cabinet, 7; chaired and distinguished professors, 9; deans, 8; directors, 8;
 - faculty assembly, 6; faculty senate, 5;
 - staff council, 6; student administration, 6; Local 814, 6
- grading scale, 27
 - forfeited transcripts, 28; GPA, 27;
 - incompletes, 27; loser than C, 28;
 - pass/fail, 27; plus/minus, 27; S/U, 27;
 - senior petition, 28; transcripts, 28;
- graduate assistantships, 44
- graduate council, 14
- graduate education, 12
 - academic common market, 13;
 - application, 16; graduate council 14;
 - graduate faculty, 14; minimum admission 13; office of, 13; organization of, 13; policies, 13; schools and colleges, 14; seminars, 12
- graduate faculty, see faculty
- GMAT, 16
- GRE, 16

H

- Harley O. Staggers National Transportation Center, 474
- Health sciences fees, 48
- Higher Education Resource Fund, 48
- history, 143
 - courses, 144; faculty, 95
- housing, 36
- Housing Information and Research Center, 474
- human performance and applied
 - exercise science, 417; exercise physiology, 417; faculty, 402; occupational therapy, 420; physical therapy, 424
- Human Resources and Education, College of, 330**
 - counseling, 338; degrees, 11; educational leadership studies, 345; educational psychology, 349; elementary education, 353; faculty, 333; graduate programs and degrees, 330; reading, 359; rehabilitation counseling, 362; secondary education, 365; social and cultural foundations, 371; special education, 372; speech pathology and audiology, 379; technology education, 384
- humanities, 151

I

- industrial and management systems
 - engineering, 302
 - courses, 305; faculty, 266
- industrial extension service, 269
- industrial relations, 216
 - courses, 219
- interdisciplinary studies degrees, 11
- International Center for Disability Information (ICDI), 475
- international students, 18
 - academic records, 20; English proficiency, 19; financial documents, 19; intensive English program, 19 ;
 - letter of inquiry, 18; official documents, 19; student visa, 19; TOEFL scores, 19; transferring within USA, 20

J

Journalism, Perley Isaac Reed

School of, 390

courses, 396; degrees, 11; faculty, 391

L

lab fees, 40

Law, College of, degrees, 11

liberal studies, 151

library services, 36

loans and employment, 45

Local 814, 6

M

management and industrial relations
faculty, 192

maps of campus, 490

marketing faculty, 193

master of public health program
fees, 49

mathematics, 153; courses, 154;
faculty, 96

mechanical and aerospace engineer-
ing, 310; courses, 315; faculty,
267

medical technology, 427; courses,
430; faculty, 403

Medicine, School of, 400

anatomy, 406; degrees, 12;

biochemistry, 410; center on

aging/Education unit, 412;

community health program, 413;

exercise physiology, 417; faculty,

401; graduate programs and

degrees, 400; human performance

and applied exercise science, 417;

occupational therapy, 420;

physical therapy, 424; medical

technology, 427; microbiology and

immunology, 431; pharmacology

and toxicology, 435; physiology,

437; public health, 440;

microbiology and immunology, 431

courses, 433; faculty, 403

mine emergency preparedness
center, 270

mining engineering, 320

courses, 321; faculty, 268

mining extension service, 269

Morgantown, 36

multidisciplinary studies, 475

museum, COMER, 270

music, 234

courses, 240; faculty, 224; fees, 40

N

National Research Center for Coal and
Energy, 475

National Transportation Center, Harley O.
Staggers, 474

non-degree applicants, 17

advising, 22; enrollment, 22

non-sufficient funds check policy, 42

Nursing, School of, 443

degrees, 12; courses, 448; faculty, 443

O

Oak Ridge Associated Universities (ORAU),
476

occupational therapy, 420

courses, 423; faculty, 402

off-campus study, 25; fees, 40

orthodontics, 258; courses, 258

P

part-time enrollment, 26

Particle Analysis Center faculty, 268

Perley Isaac Reed School of

Journalism, see Journalism, Perley

Isaac Reed School of

petroleum and natural gas engineering, 325

courses, 325; faculty, 268

pharmaceutical sciences, 452

pharmacology and toxicology, 435

courses, 437; faculty, 404

Pharmacy, School of, 451

courses, 454; degrees, 12; faculty, 452;

fees, 49; graduate programs and de-

grees, 451; pharmaceutical sciences,

452

philosophy courses, 159; faculty, 97

Physical Education, School of, 455

courses, 458; degrees, 12; faculty, 455;

graduate programs and degrees, 455

physical therapy, 424

courses, 427; faculty, 402

physics, 160

courses, 161; faculty, 97

physiology, 437

courses, 439; faculty, 404

plan for numbering courses, 51

plant and soil sciences, 85

- courses, 85; faculty, 57
- plus/minus grading, 27
- political science, 165
 - courses, 167; faculty, 97
- previous graduate study, 23
- programs and courses, 51
 - abbreviations used in course listings, 52; common course numbers and descriptions, 51; plan for numbering courses, 51; schedule of courses, 51
- provisional classification, 23
 - reclassification, 23
- PRT (personal rapid transit) system, 36-
- psychology, 171
 - courses, 172; faculty, 98
- public administration, 177
 - courses, 179; faculty, 100
- public health, 440
 - courses, 441; faculty, 405; fees, 49

R

- reading, 359
 - courses, 360
- reapplication, 18
- readmission, 18
- reclassifications, 23
 - of provisional students, 23
- records, 25
- refund policy, 41
 - dropped courses, 41; non-sufficient funds policy, 42; schedule, 42
- Regional Research Institute, 477
- rehabilitation counseling, 362
 - courses, 363; faculty, 333
- religious studies courses, 180
- remission of fees, 43
- reproductive physiology, 90
 - faculty, 59
- research assistant, 43
- research guidelines, 30
- residence assistant, 44
- residency policy for admission and fee purposes, 38
- resource management faculty, 58

S

- safety and environmental management, 328
 - courses, 328; faculty, 268
- schedule of courses, 51

- scholarship, 26
 - forfeited transcripts, 28; GPA, 27; grades less than C, 28; grading scale, 27; incompletes, 27; pass/fail grades, 27; plus/minus grades, 27; satisfactory/unsatisfactory grades, 27; senior petition, 28; transcripts, 28

School of Dentistry, see Dentistry, school of

School of Journalism, see Journalism, Perley Isaac School of

School of Medicine, see Medicine, school of

School of Nursing, see Nursing, school of

School of Pharmacy, see Pharmacy, school of

School of Physical Education, see Physical Education, school of

School of Social Work, see Social Work, school of

secondary education, 365

- courses, 366

senate, faculty, 5

senior petition, 28

social and cultural foundations, 371

- courses 371; faculty, 337

Social Work, School of, 464

- courses, 471; degrees, 12; faculty, 464

sociology and anthropology, 181

- courses, 182; faculty, 100

special education, 372

- courses, 376

speech pathology and audiology, 379

- courses, 380; faculty, 337

staff council, 6

statistics, 184

- courses, 186; faculty, 100

stipends, 44

student administration, 6

student refund policy, 41

- dropped courses, 41; non-sufficient check policy, 42; refund of fees, 41; schedule, 42

Swiger Fellowships, 44

T

teaching assistant, 43

- fellow, 44

technology education, 384

- courses, 387; faculty, 337

- Technology Field Service, 478
- theatre, 245
 - courses, 248; faculty, 225
- theses, 31
- transcripts, 17, 28
 - forfeiture, 28
- transfer procedures, 20
 - credit hours, 20; internal credit transfer, 21; program transfer, 21
- Transportation Center, see Harley O. Staggers Transportation Center, 474
- Trustees, Board of, 5
- tuition waivers, 41

U

- University Affiliated Center for Developmental Disabilities (UACDD), 478
- University System of WV Board of Trustees, 5

V

- veterans educational assistance, 45
- vice presidents, assistant, 8

W

- waivers of fees, 41
- W.E.B. DuBois fellowships, 45
- West Virginia Network for Educational Telecomputing (WVNET), 37
- withdrawals, 29
 - from classes, 29; from the University, 29
- women's studies, see Center for Women's Studies
- WVNET, 37
- WVU Board of Advisors, 5, 7
- WVU cabinet, 7
- WVU Extension Service, 478

West Virginia University Calendar 1998-99

The University calendar includes the academic year, which is composed of two semesters of approximately seventeen weeks each, and two summer sessions of six weeks each.

Spring 1998

January, 7	New Student Orientation
January, 8	New Student Orientation
January, 9	New Student Orientation
January, 9	General Registration
January, 12	First Day of Classes
January, 12	Late Registration Begins
January, 16	Last Day to Register and Make Changes
January, 19	RECESS - Martin Luther King's Birthday
February, 7	West Virginia University Day
February, 27	Mid-Semester
March, 3	Mid-Semester Reports Due
March, 7 through March 15	RECESS - Spring Break
March, 27	Last Day to Drop a Class
April, 10	RECESS - Friday Before Easter
April, 11	Day of Special Concern (Passover)
April, 17	Weekend of Honors
April, 18	Weekend of Honors
April, 19	Weekend of Honors
April, 30	Last Day to Withdraw
May, 1	Last Day of Classes
May, 4	Final Examinations
May, 5	Final Examinations
May, 6	Final Examinations
May, 7	Final Examinations
May, 8	Final Examinations
May, 9	Final Examinations
May, 11	Grade Reports for Graduates Due in Dean's Office
May, 11	Dean's Reports for Graduates Due in Admissions
May, 12	RECESS - Election Day
May, 16	Alumni Day
May, 17	Commencement

Summer I 1998

May, 20	Registration
May, 20	First Day of Classes
May, 21	Late Registration Begins
May, 25	RECESS - Memorial Day
May, 26	Last Day to Register and Make Changes
May, 12	Last Day to Drop a Class
May, 29	Last Day to Withdraw
May, 30	Final Examinations
May, 30	Last Day of Classes

Summer II 1998

July, 1	Registration
July, 1	First Day of Classes
July, 2	Late Registration Begins
July, 3	RECESS - Independence Day
July, 7	Last Day to Register and Make Changes
July, 24	Last Day to Drop a Class
August, 6	Last Day to Withdraw
August, 7	Final Examinations
August, 7	Last Day of Classes

Fall 1998

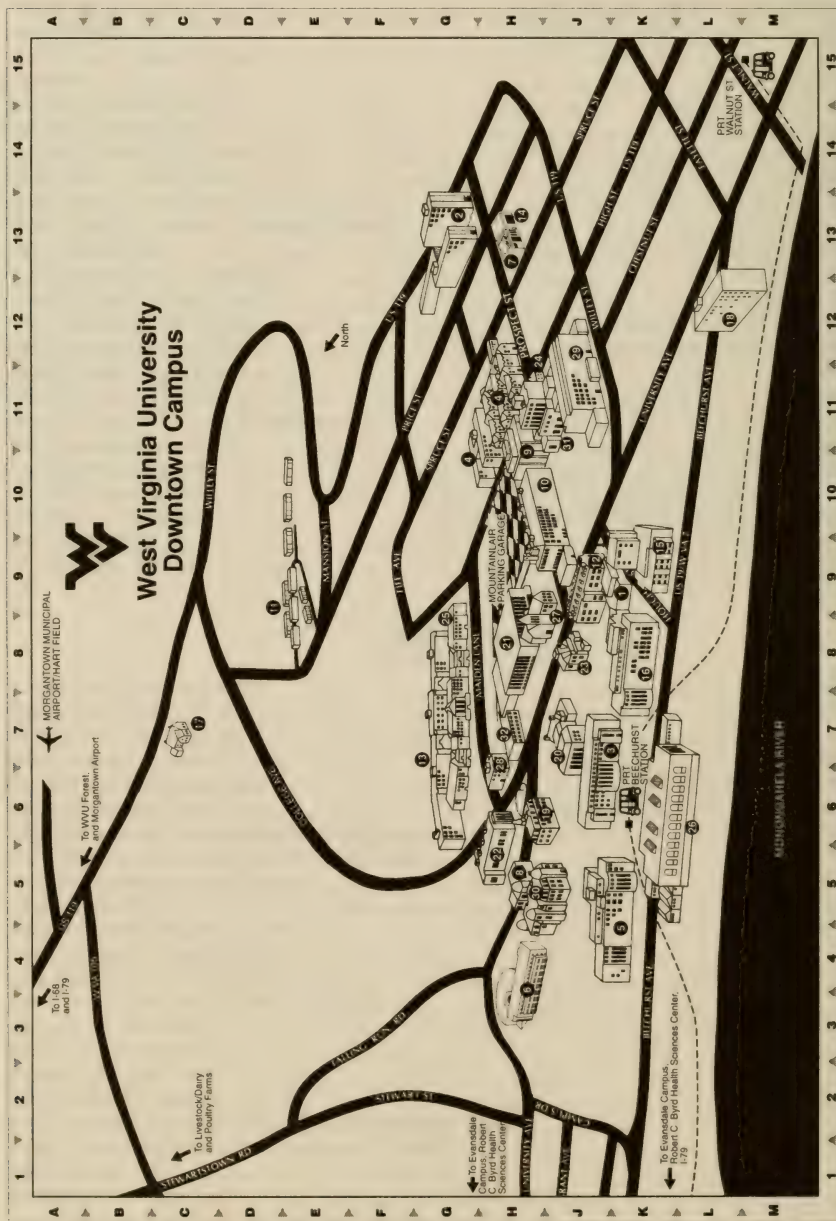
August, 19	New Student Orientation
August, 20	New Student Orientation
August, 21	New Student Orientation
August, 24	General Registration
August, 25	First Day of Classes
August, 25	Late Registration Begins
August, 28	Last Day To Register and Make Changes
September, 7	RECESS - Labor Day
September, 21	Day of Special Concern (Rosh Hashannah)
September, 30	Day of Special Concern (Yom Kippur)
October, 9	Mid-Semester
October, 3	Mid Semester Reports Due
October, 30	Last Day to Drop a Class
November, 3	RECESS - Election Day
November, 21 through November 29	RECESS - Thanksgiving
December, 10	Last Day to Withdrawal
December, 11	Last Day of Classes
December, 11	December Graduates Convocation
December, 14	Final Examinations
December, 15	Final Examinations
December, 16	Final Examinations
December, 17	Final Examinations
December, 18	Final Examinations
December, 19	Final Examinations

Spring 1999

January, 6	New Student Orientation
January, 7	New Student Orientation
January, 8	New Student Orientation
January, 8	General Registration
January, 11	Late Registration Begins
January, 11	First Day of Classes
January, 15	Last Day to Register and Make Changes
January, 18	RECESS - Martin Luther King's Birthday
February, 7	West Virginia University Day
February, 26	Mid-Semester
March, 2/	Mid-Semester Reports Due
March, 26	Last Day to Drop a Class
March, 27 through April 4	RECESS - Spring Break
April, 1	Day of Special Concern (Passover)
April, 16 through April 18	Weekend of Honors
April, 29	Last Day to Withdrawal
April, 30	Last Day of Classes
May, 3 through May 8	Final Examinations
May, 10	Grade Reports for Graduates Due in Dean's Office
May, 11	Dean's Reports for Graduates Due in ARC
May, 15	Alumni Day
May, 16	Commencement

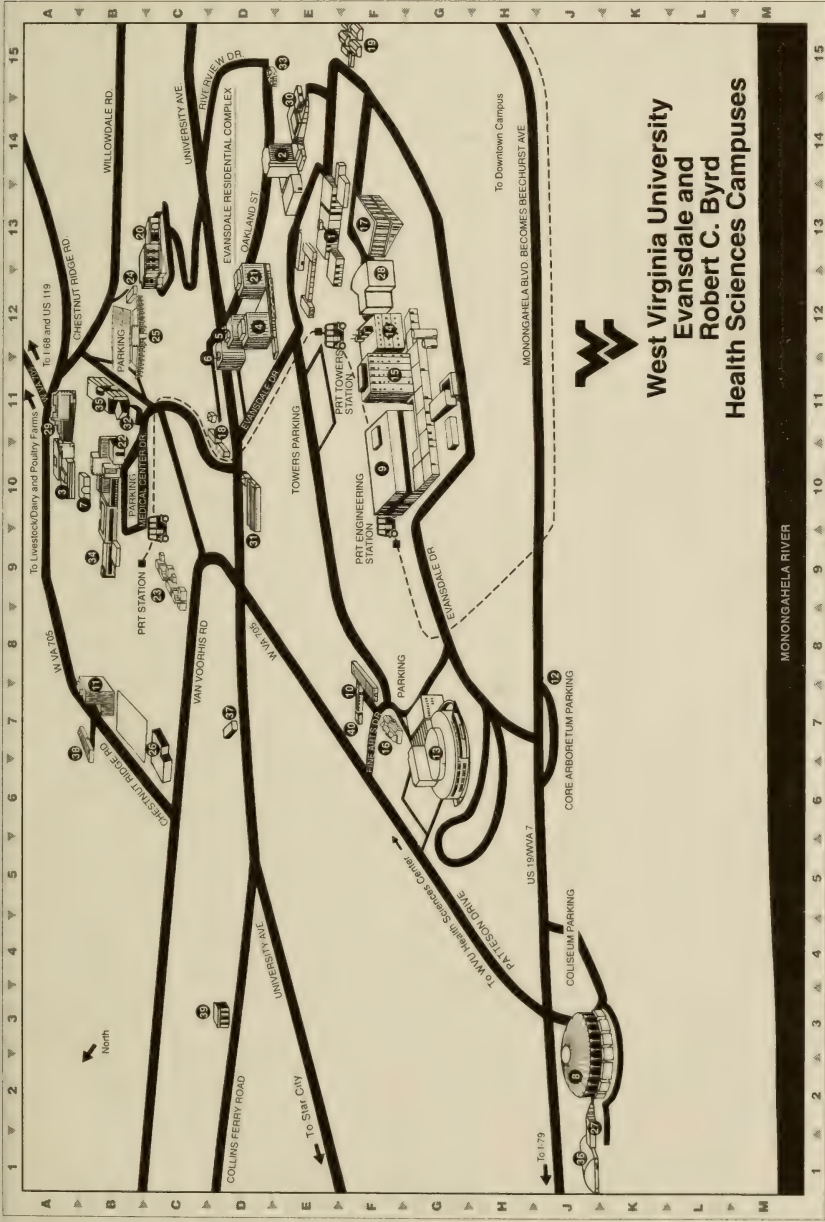
Alphabetical Listing of Buildings

Site Number	Building	Location
1	Admissions and Records	J-9
2	Arnold Hall	G-13
3	Armstrong Hall	J-6
4	Boreman Hall	H-11
5	Brooke Hall	J-4
6	Business and Economics Center for Black Culture	H-4
7	and Research	H-13
8	Chitwood Hall	H-5
9	Chemistry Research	H-11
10	Clark Hall	H-10
11	College Park Apartments	E-9
12	Colson Hall	J-9
13	Dadisman Hall	G-7
14	Daily Athenaeum	H-13
15	Eiseland Hall	K-9
16	Hodges Hall	K-8
17	Institute for History of Technology and Industrial Archaeology	C-7
18	Knapp Hall	L-12
19	Martin Hall	H-6
20	Elizabeth Moore Hall	J-7
21	Mountainair	H-8
22	Oglebay Hall	H-5
23	Purinton House	J-8
24	Regional Research Institute	H-11
25	Stalnaker Hall	G-8
26	Stansbury Hall	K-6
27	Stewart Hall	H-8
28	Student Services Center	H-6
29	White Hall	J-11
30	Woodburn Hall	H-5
31	Wise Library	J-11
32	WVU Bookstore, Career Services	H-7

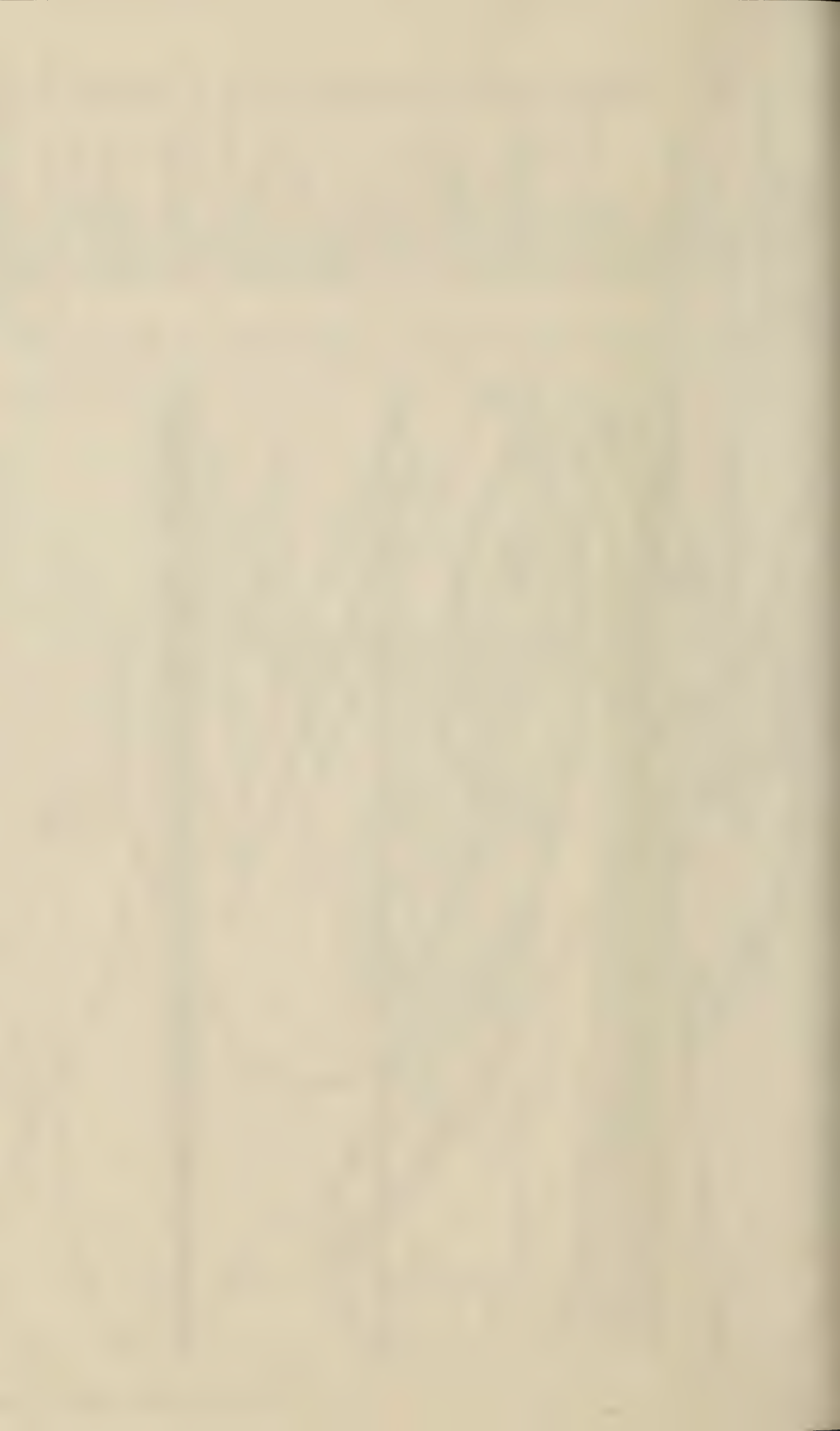


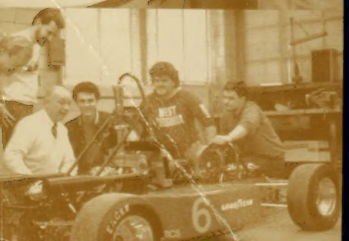
Evansdale and Health Sciences Campuses Alphabetical Listing of Buildings

Site	Building	Location
1	College of Agriculture, Forestry and Consumer Sciences	F-13
2	Allen Hall	E-13
3	ALOSH	A-10
4	Bennett Tower	D-12
5	Braxton Tower	C-12
6	Brooke Tower	C-11
7	Chestnut Ridge Hospital	A-10
8	Coliseum	J-2
9	Mineral Resources Building	G-11
10	Communications Building	F-7
11	Concurrent Engineering Research Center	B-7
12	Core Arboretum	J-7
13	Creative Arts Center	G-6
14	Engineering Research	F-12
15	Engineering Sciences Building	F-11
16	Erickson Alumni Center	F-7
17	Evansdale Library	F-13
18	Faculty Housing	C-11
19	Greenhouses	F-15
20	College of Law	B-13
21	Lyon Tower	D-12
22	Mary Babb Randolph Cancer Center	B-10
23	Medical Center Apartments	C-9
24	Milan Puskar Facilities Center	B-10
25	Mountaineer Field	B-12
26	Mountainview Rehabilitation Hospital	B-6
27	Natatorium	J-2
28	National Research Center for Coal and Energy	F-12
29	NIOSH	A-11
30	Perical Hall	E-14
31	Physical Plant	D-10
32	Physician Office Center	B-11
33	President's House	D-15
34	Robert C. Byrd Health Sciences Center	B-9
35	Ruby Memorial Hospital	B-11
36	Shell Building	J-1
37	University Services Center	D-7
38	WV Network for Educational Telecomputing	A-7
39	WVU Foundation	C-3
40	WVU Visitors Center	F-7



West Virginia University
Evansdale and
Robert C. Byrd
Health Sciences Campuses





1998-2000 Graduate Catalog
West Virginia University
Office of Admissions and Records
PO Box 6009
Morgantown, WV 26506-6009

West Virginia University
USPS 676-980 periodicals postage
paid at Morgantown, WV 26505
and additional mailing offices

su^{Expect it}**ccess**

